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The Lesson of the Charing Cross Accident.

THE startling disaster at Charing Cross has raised the question among engineers as to the continued safety of iron structures dating from the middle of last century, and awakened the doubt sleeping in the mind of many an architect whether iron and steel ought to be regarded as permanently trustworthy materials of construction.

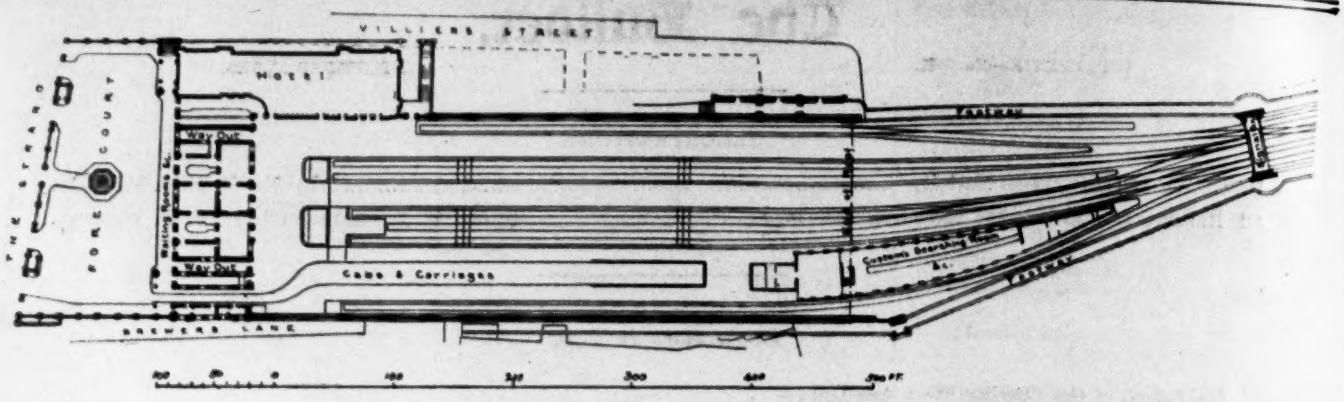
The two points are connected to some extent, although the conditions under which the materials are employed are very different. Iron members incorporated in a bridge or roof are fully exposed to climatic influences, except for the more or less inefficient protection afforded by a thin layer of paint. They can be inspected and replaced as occasion demands, and so the life of an engineering structure, whether of cast-iron, wrought-iron, or mild steel, may be extended almost indefinitely. In justification of this statement we may point to the cast-iron arch at Ironbridge, now more than a century and a quarter old; the Menai Suspension bridge, with the respectable age of eighty-five years; the High-Level bridge at Newcastle, and the Britannia bridge across the Menai Straits, both in their sixtieth year; to the Crystal Palace, more than fifty years old, and to many other historic iron structures still enjoying a green and vigorous old age. The periodical failure of bridges and the occasional collapse of other engineering structures in the United States can be disregarded, because in one case the reason is inadequate strength for loads not contemplated by the original designers, and in the other risky design or faulty workmanship.

What may happen some day to buildings which rely for strength upon embedded iron and steel columns and joists, no one would like to predict with certainty. When iron has been buried in brick walls it cannot be examined, repainted, or replaced like the members of a purely metallic structure. Brick masonry is by no means impervious to moisture, and it is not unreasonable to suppose that corrosion goes on to a very considerable extent in the metal concealed. We certainly believe architects would be wise to insist upon the protection of iron and steel members so incorporated in their buildings by something more durable than a mere coat of paint. This question, however, does not precisely arise out of the Charing Cross roof collapse, and what little connexion it might otherwise have with that disaster is largely destroyed by the fact that Charing Cross roof is of wrought-iron, manufactured and worked in accordance with practice long since superseded by the improved methods now employed for the preparation of structural steel girders, joists, and other members used in architectural practice.

Consequently, the object lesson of Charing Cross applies only in a limited way to ordinary building construction, and need not in itself add materially to the doubts reasonably entertained as to the life of steelwork embedded in such manner as to be exposed to corrosion without the possibility of access.

Still, the investigation of the causes leading to the recent mishap deserves to be closely followed by architects, and, with the object of helping in this direction, we give in the present article some drawings and a brief description of the main constructional features of Charing Cross station. To these details we add some particulars furnished by personal inspection of the ruins. Our hope is that the information so provided will, in some measure, assist our readers to appreciate the importance and relevancy of evidence brought forward hereafter at the two official inquiries that have been commenced.

Fig. 1 is a plan of the railway-station, which was completed in 1860 from the designs of the late Sir John Hawkshaw, the contractors for the roof having been Messrs. Cochrane, Grove, & Co., of Dudley. The drawing reproduced shows the general arrangement of the station and the thickness of the walls at rail level. As the position of the streets on either side prevented the employment of abutments to sustain the thrust of the roof, the principals had to be designed as arched trusses, so as to be self-contained. The end of each wall was terminated by a pier somewhat thicker than the piers in the length of the walls, but still not sufficiently massive to give an appearance of strength to the construction. As a considerable slope exists from the Strand



Plan of Charing Cross Station.

down to the Embankment, the height of the brickwork increases very much towards the lower end. At Cannon-street station, which is of similar but generally better design, also by Sir John Hawkshaw, the weakness of open ends was avoided by the erection of two massive towers, each 24 ft. square, at the river end of the station. Nothing of the kind exists at Charing Cross, but, some time after the completion of the station, the eastern wall was strengthened by the arched buttresses indicated in Fig. 1. These were added for the purpose of resisting the effects of lateral wind pressure, and now give access to the London County Council footbridge, opened for traffic in the year 1878.

It may be thought that the heavy girder forming the lower member of the wind screen, and extending from side to side at the southern end of the station, might operate to bind the walls together. In point of fact, this girder could scarcely have acted as a tie, for during the collapse the eastern end was dragged from its support and the girder fell from its place, with a lateral movement towards the west wall, and in falling scored a groove of segmental outline on the inner face of the eastern wall down to a point where the end of the girder reached a distance of about 15 ft. above rail level. Below that height the girder evidently swung clear of the brickwork. Hence it is clear that, with the exception of the part strengthened by the buttresses added at a later date, the station walls were incapable of resisting lateral pressure. This condition was foreseen by Sir John Hawkshaw and provided for in the design of the roof, and is one that must be duly recognised by all who wish to arrive at a correct opinion as to the true cause of the recent failure.

Let us turn next to Fig. 2, which includes a transverse section of the roof principal, or truss, and a plan of one bay, both drawn to Scale B, various small details to Scale A, and a section of the main rib of the truss to Scale C.

The roof comprises fourteen principals, in addition to the wind screen, which is of entirely different construction. Each truss has the clear span of 166 ft., and the trusses are spaced 35 ft. apart, centre to centre, forming fourteen bays. Thus the area covered measures 490 ft. by 166 ft.

The curved main rib of each truss is a wrought-iron plate girder with a rise of 45 ft., and when built consisted of a web plate 18 in. deep by $\frac{1}{2}$ in. thick, with flanges formed of 6-in. by 3-in. by $\frac{1}{2}$-in. angle-bars, as shown in the section at right-hand top corner of Fig. 2. Each end of the rib opens out to the width of 2 ft., as indicated by the detail end view in the same figure. At the eastern end the foot of the principal is fixed to the stone cap upon the top of the brickwork, and at the western end provision is made for expansion by means of a suspension link saddle. These details are shown by the small drawings under the section of the roof truss in Fig. 2.

The type of expansion joint here introduced is not so desirable as one with rollers, because hinged joints are always liable to be rusted up, and such a result is by no means improbable in the case of a roof that has stood in place for forty-five years. In this connexion it may be noted that the analogous principals in the Cannon-street roof were provided with roller bearings at the free end. Supposing the joints at Charing Cross had become fixtures, the roof would still be free to expand upwards, but this facility would not relieve the western wall from alternations of push and pull, induced by temperature variations. We do not say that the suspension saddles had become fixed, but merely call attention to the fact that this is not improbable. If such a condition has been in existence for several years the cohesion of the brickwork must have been seriously reduced, and the conseqent weakening of the wall would not be without its effect upon the failure, however small that effect might be.

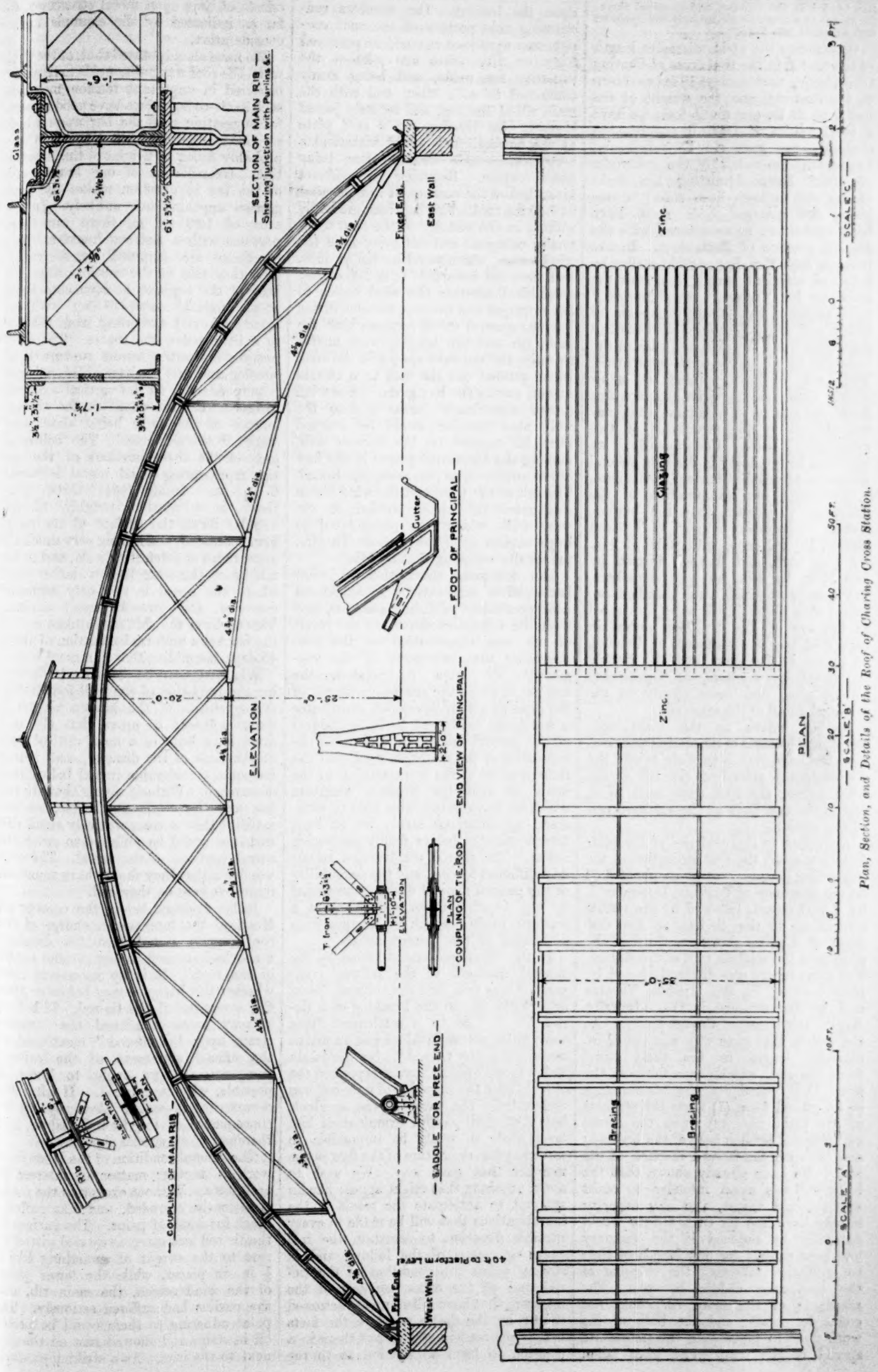
To make the roof principals self-contained, and thereby to prevent the development of thrust against the wall at the free end, the main rib is trussed, as shown in Fig. 2, the chief members being vertical struts at eight points, dividing the truss into nine panels; diagonal ties in each of the inner seven panels; and a tie-bar forming the lower member common to all the panels. Each strut consists of two 6-in. by 3-in. by $\frac{1}{2}$-in. tee-bars bolted together, and each diagonal tie of a 4-in. by $\frac{1}{2}$-in. flat bar provided with cotters and gibs for tightening purposes. The struts and diagonals are riveted to $\frac{1}{2}$-in. plates connected with the main rib at the top, and with the screwed coupling-boxes of the tie-bar at the bottom. By the detail drawings in Fig. 2 it will be seen that the three members meeting at the main rib are very securely connected, while the similar connexion at the tie-rod couplings does not seem to be so secure. Of course, as the struts press strongly against the coupling-boxes there is not so much need for mechanical connexion there as at the top, the chief thing being to connect the struts and diagonals firmly together, and to make provision for preventing the group of three members from slipping out of place at each coupling-box. In view of the fact that the fractured tie-rod of the first principal broke away from the bracing and hung downward from the outer wall, and that the broken tie-rod of the second principal now hangs below the bracing of three panels, it is evident that the connexions were not so secure as could have been desired.

Notwithstanding the perilous appearance of the second roof truss, that member did not fall. The fracture of the tie-rod occurred near the eastern wall, which, being strengthened by buttresses, was probably able, with the assistance of the truss bracing, to resist the outward thrust developed after the fracture of the main tension member. The point is an interesting one, upon which further information will no doubt be forthcoming at a later date.

The tie-rod is made up of nine lengths of the following diameters:—4$\frac{7}{8}$-in. in the end panels; 4$\frac{3}{8}$-in. in the second panels, 4$\frac{1}{4}$-in. in the third panels; 4$\frac{3}{8}$-in. in the fourth panels; and 4$\frac{1}{4}$-in. in the centre panel. At each end of the truss the tie-rod is fixed into the piece projecting from the foot of the principal by means of a cotter and gib fastening, which permits the regulation of tension. The ends of each length of the tie-rod are of enlarged cross-section, and being threaded are screwed into the coupling-boxes. This method of construction looks very well on paper, but, owing to the fact that in 1860 the resources of ironworks were not equal to the rolling and forging of bars so large as those used at Charing Cross, without having recourse to welds, the tie-rods are not so strong as their cross-section suggests. The point here raised is of much importance, and will probably be found to possess an intimate connexion with the failure of the roof.

For the purpose of making clear to our readers what was the practice of iron manufacturers at the date when the station was built, we quote the following passage from a paper read by the late Sir Henry Bessemer at the 1856 meeting of the British Association, when, describing his new process of manufacturing malleable iron and steel, the author said:—

"It is true that hitherto no better method has been known than the puddling process, in which from 4 cwt. to 5 cwt. of iron is all that can be operated upon at a time, and even this small quantity is divided into homœopathic doses of some 70 lb. or 80 lb., each of which is moulded and fashioned by human labour, carefully watched



Plan, Section, and Details of the Roof of Charing Cross Station.

and tended in the furnace, and removed therefrom, one at a time, to be carefully manipulated and squeezed into form."

Considering the 4½-in. diameter length of the tie-rod in the roof truss at Charing Cross, taking the length at 19 ft., as shown in the drawing, and the weight of the metal at 53 lb. per lineal foot, we have a total weight of 1,007 lb., which was evidently too great to be rolled and forged without welds by the ironworks of 1860. Even admitting the body of the bar to have been rolled in one piece, the enlarged ends must have been welded on, in accordance with the general practice of those days. In the present day the bar could easily be rolled of sufficient length to permit the ends to be "upset" or "jumped," thus avoiding the known weakness of welds, and the indeterminable weakness depending upon the skill and care of the workmen by whom the welds were made. The facts we have pointed out show clearly that modern structures are free from one source of weakness that was unavoidable in the structures of two generations back. Consequently, we must not be too hasty in drawing general conclusions from the Charing Cross failure.

Continuing our examination of the drawings, it is seen that the purlins, sixteen in number, consist of latticed girders, 19½ in. deep, with webs of 2-in. by ⅜-in. bars, and flanged, formed by two 3½-in. by 3-in. by ½-in. angle-bars, the manner in which these members are joined with the main rib being illustrated at the top of Fig. 2. The purlins in each roof bay are stiffened by bracing, as shown in the plan, and the glazing is carried by tee-bars, as represented in the plan, and more clearly in the sectional detail of the main rib.

Having before us the main constructional features of the station walls and roof, the next step is to state briefly the circumstances attending the fall of the wind screen, the roof truss next to it, and of the two bays at the southern end of the station.

According to the evidence of the platform inspector, the first indication of the impending disaster was given about 3.30 on the afternoon of Tuesday, December 5, by a loud report, followed by the visible separation of the tie-bar of the first truss, at a point about one-third of the span from the western wall of the station. The same report was distinctly heard by men working in the Avenue Theatre and by draughtsmen in the Admiralty Works Department, Craven-street. As the section that gave way was the 4½-in. diameter length in the third panel from the end, exactly one-third of the truss then relied for the maintenance of its curved form (1) upon the stiffness of the main rib; (2) upon the struts and diagonal tension bars of the bracing; and (3) upon the inward reaction of the wall. We have already shown that the brick wall was never intended to resist any outward thrust, and any capacity it may have had for such a duty would naturally be reduced if the masonry had been subject for any length of time to oscillation following the clogging of the suspension saddle by rust. The resistance of the main rib could not count for much, and the bulk of the work done in preventing the immediate spread of the truss must have fallen upon the bracing. The members constituting this portion of the roof construction were such as could be produced forty or fifty years ago without the necessity for welds, and being firmly connected to each other, and with the main rib at the top, and securely joined together by riveting to a stiff plate at the bottom, they would withstand a very considerable strain before being pulled apart. Referring to evidence given before the coroner, it appears that at 3.45 the roof, which had been gradually sinking in the vicinity of the first truss, finally collapsed and fell away from the wind screen, which stood for ten seconds, and then fell inwards. It is not clearly established whether the wind screen or the principal was the first to come down, but the general result suggests that the main rib and the bracing were unable to resist the outward spread of the roof, which pushed out the wall to a certain extent, and as the box girder of the wind screen was firmly anchored into the wall, that member would be dragged from its support on the eastern wall, making the segmental groove in the face of the brickwork as previously mentioned. The fall of the truss and the wind screen overturned the upper portion of the west wall, which was precipitated in huge masses upon the Avenue Theatre, practically wrecking that building.

The foregoing description of what happened is substantially in agreement with previously published accounts, and with the inferences drawn as the result of our own examination on the site. Assuming the correctness of the suggestions we have interpolated, the manner in which the successive stages of the disaster slowly developed constitutes a wonderful testimony to the soundness of the general design, as well as to the excellence of the materials used, and the thoroughness of the workmanship in the main rib and the bracing, members which we have shown were able to withstand an enormous strain for at least fifteen minutes before finally confessing defeat. The tie-rod construction stands on a different footing, and the desirability of the general type of design represented by the Charing Cross roof is quite a separate matter, which we abstain from discussing in the present article.

In the official statement issued by the general manager of the railway company it was said that the collapse "was apparently due to the breaking of a tie-rod . . . or to a settlement from some unknown cause which put an undue strain upon the tie-rod." Sir Benjamin Baker is reported as having expressed the opinion that the snapping of a tie-rod was undoubtedly the cause of the accident, but that until careful examination had been made it would be impossible to say what was the nature of the flaw in the member that gave way. We wish to avoid anything that might appear like an attempt to anticipate the result of the investigations that will be made in every possible direction to ascertain the real cause or causes of the failure, and in stating below the condition of the tie-rod and of the other portions of the ironwork that have fallen, we are actuated chiefly by the desire to place the facts before our readers and to put them in a position to form an opinion as to the effects of time upon metal structures, so far as indicated by the example under consideration.

We have already stated that, at the time when the roof was built, welds necessarily occurred in important tension members such as tie-rods, and we have good reasons for suggesting that the bar upon which so much depended at Charing Cross probably failed at a joint of this description. Examination of one broken end of the bar in question makes this suggestion anything but unlikely. In the area of 15·9 sq. in. there are three portions with a lustrous fracture. Two of these are disposed symmetrically on either side of the vertical axis, the base of the segment in each case being at an angle of about 40 deg. with the same axis, and extending from the top to a little below the centre. The third portion indicating recent rupture is of smaller area, and the base of this segment is perpendicular to the vertical axis, the distance from the chord to the circumference of the circle being about one-sixth of the diameter. The collective area of the three portions of the section representing sound metal is barely 6 sq. in. Inside these three areas there is a portion roughly of triangular form, the surface of the metal being corroded, and having very much the appearance of a defective weld, and in the middle of the triangle is a darker area, where the metal is not only seriously corroded, but presents small cavities. Viewed from the side the broken end of the bar has a uniform inclination of about 45 deg., resembling that of a scarf weld.

Whatever may be discovered concerning the condition of the wall foundation, the condition of the broken tie-rod is quite sufficient to prove that the roof must have been in a most critical state at the time of the disaster, and indeed for some considerable period before that occurrence. Without saying that the tie-bar was the originating cause, we are satisfied that a comparatively small disturbance would be sufficient to sever the sound portions of the metal. The only wonder is that they should have remained intact so long as they did.

In his evidence before the coroner on Monday, the foreman in charge of the roof repairs stated that "a diagonal brace had cracked almost in the centre of the roof." It is by no means clear whether this bar gave way before or after the severance of the tie-rod. If before, it may have occasioned the "undue strain upon the tie-rod" mentioned in the official statement of the railway company, and we ought to know, if possible, why it cracked. If after the occurrence, it would obviously be in consequence of the tie-rod failure, and therefore of no special significance.

The general condition of the fallen ironwork is another matter of interest to architects. Without exception the metal is seriously corroded, and has suffered much for want of paint. The surface of the tie-rod was eaten away and pitted by rust to the extent of something like a ¼ in. in places, while the lower girder of the wind screen, the main rib, and the purlins had suffered seriously. The paint adhering to them could be peeled off in strips and showed rust on the side next to the iron. As a striking example

of the extent to which the ironwork has deteriorated since it was first erected, we may point to the fact that the web of the main rib, originally ½ in. thick, has dwindled down to a thickness of little more than perhaps $\frac{3}{16}$ in. Several holes had been knocked clean through this web, and in one place a tee-bar of about 3 in. by 3 in. had been driven through the web, the end projecting for a length of some feet. The seriously corroded condition of the roof had been known for some time past to the directors of the railway company, and the cleaning and repainting operations in progress at the time of the disaster prove that they were taking measures to prevent the further disintegration of the work. From what we have seen, however, it is manifest that something more than mere painting was required.

In conclusion, we may mention that on inspecting a portion of the box girder formerly at the bottom of the wind screen we noticed that, while the outside was much corroded, the surfaces of the metal inside the girder had suffered very little, and in the portions we were able to examine were still covered for the greater part by the original mill scale. Although not conclusive testimony, the circumstance may tend to reassure architects as to the fate of iron and steel members placed in dry walls where they are shielded from direct exposure to the atmosphere.

NOTES.

Waterworks and Mining Rights.

LAST week we commented on the rights of parties where a subsidence has been caused by mining operations under roads; this week an important question has been raised in the Law Courts in connexion with the reservoirs which have been constructed by the Corporation of Manchester for the water supply of that city. The action was brought by the corporation against the defendants, who were lessees and owners of certain coal seams, for an injunction and damages for subsidence caused in the reservoirs from the defendants' mining operations. The defence was twofold; in the first place the defendants asserted that the plaintiff corporation had purchased the land subject to the mining rights, and that as far as concerned the workings within 40 yds. of the reservoirs they had been given the opportunity of treating for a purchase of the mining rights, but had refused to avail themselves of the opportunity. As to the workings at a greater distance than 40 yds. the defendants alleged that there was no right in the plaintiffs to support. These issues necessitated a trial extending over many days, but in the result the corporation failed in their action. The Court held that as regards the workings within 40 yds., as the plaintiffs had not availed themselves of the terms of the statute which regulated their powers, the Waterworks Clauses Act, 1847, and treated for the purchase of the rights, they were without remedy, and as regards the workings outside that limit which are defined by the same Act, the corporation had no rights, as their Private Act had not extended the limits. This is another example of the drawbacks attending municipal enterprise, and before long, we fancy, the ratepayers must become alive to the disadvantages attending a system which renders them liable as shareholders with unlimited liability and with no control.

Noisy Localities.

WE would not recommend anyone who is not a lawyer to read the lengthy judgment of the Court of Appeal in the case of Rushmer *v.* Polsue & Alfieri, Limited, important though these judgments are. The point at issue was whether a householder can obtain an injunction to prevent annoyance—in the present case the working of printing machines—when he lives in a mechanical neighbourhood. In other words, is the nuisance, we use the word in a legal sense, to be regarded, bearing in mind the standard of the neighbourhood? "What would be a nuisance in Belgrave-square would not necessarily be so in Bermondsey," was once said by the judges in a leading case. In the present case the result of the judgment seems to be that, while the standard of the neighbourhood must be regarded as the primary test, that standard does not allow a thing to be done so as to injure a dweller in the locality, if it is, so to say, an extension of the standard. In other words, you cannot, if you go and live in a locality chiefly occupied by printing works, complain of a normal noise of a machinery, but you may of a noise from works more than, and in excess of, the general quantity of noise.

"Occupiers" of Private Roads.

A CURIOUS little legal point in connexion with the roads came before the Divisional Court last week for decision in The King *v.* Somers; *ex parte* The General Estates Company. The justices, under sect. 36 of the Highway Act, 1862, had made an order that a certain private or occupation road should be declared to be a highway repairable by the inhabitants at large. The General Estates Company moved to set aside the order on the grounds that it was *ultra vires*, and that the terms of the section had not been complied with. It appeared that the company by a deed of conveyance given to their predecessors in title had acquired a right of way over this portion of the road, which adjoined a private road of which they were freeholders, in consideration of a money payment and an obligation on their part to keep the road in repair, and they contended that they, in respect of this right of way, were "occupiers" of the road within the meaning of the section, and that their consent had not been obtained. The Court decided that the section denoted persons having such an interest in the road as would be affected by an increase in the traffic—*i.e.*, owners of land or occupiers of property abutting upon the road—and that it did not extend to persons having a mere right of way.

Joint Committee on Concrete-Steel.

A SATISFACTORY sign of the times is given by the appointment of a Reinforced Concrete Committee by the Royal Institute of British Architects, and the decision to invite the co-operation of the Institution of Civil Engineers and the Institution of Mechanical Engineers in the investigation of the important subject indicated. The work of the Science Standing Committee of the Institute has done much to emphasise the intimate connexion of science with art in architectural practice, and there is reason for congratulation in the fact that architects and engineers are to join in considering the properties and uses of concrete-steel. From the very first architects have taken strong interest in this new material; civil engineers have followed suit; and in course of time we may expect mechanical engineers to discover its great adaptability to the requirements of manufactories and workshops.

Fire Tests of Concrete.

MUCH difference of opinion undoubtedly prevails as to the value of various familiar aggregates for concrete to be used in fire-resisting construction. With the object of throwing light upon this question, an experimental fire and water test was undertaken in October last by the British Fire Prevention Committee. For the purpose of the investigation, seven floor slabs were prepared with the following aggregates:—furnace slag, broken brick, broken granite, burnt ballast, coke breeze, furnace clinker, and Thames ballast. The proportions of the concrete were 1 part Portland cement, 2 parts sand, and 3 parts aggregate for all the slabs except those in which burnt ballast and coke breeze were used, the proportions in these being 1 part of Portland cement to 5 parts of aggregate. Upon examination of the slabs after exposure to fire for three hours at temperatures ranging up to 1,800 degrees Fahrenheit, followed by the application of water for two minutes, the results were found to be very divergent, and in some cases decidedly unexpected. Those who desire full particulars will find them in the official report issued by the Committee, and we must content ourselves here with a brief reference to the chief lesson to be drawn from the test—that Thames ballast is an unsuitable and entirely unreliable material for fire-resisting construction. The slab made with this aggregate was cracked across in numerous places, and curved downwards about 2 in.; the under-surface exhibited had cracks in all directions, and much of the concrete was washed off by water. These results are in striking contrast to the evidences offered by the coke breeze and burnt ballast slabs, which showed no cracks either on the top or the bottom surface, were not curved downwards at all, and only suffered in places from the effect of the water application. Although the tests are by no means conclusive, they seem to point to the fact that intrinsically weak aggregates are better for resisting fire than strong aggregates.

Shear Tests.

SOME experiments carried out for the purpose of ascertaining the behaviour of various well-known materials of construction are described in the paper read last week by Mr. E. G. Izod before the Institution of Mechanical Engineers. In tests relative to shear the most troublesome hindrance to accuracy is elongation of the outer fibres of the specimens under examination, and to obviate this

disadvantage as far as possible the author employed a special form of shearing device, consisting essentially of two hardened steel plates with cutting edges between which slides a third cutting plate, so that the opposite edges shall induce nearly perfect shear. Even with this apparatus, however, it was impossible to prevent a certain amount of stretching, which affected the fibres for about ½ in. on each side of the shearing plane. The materials examined include different qualities and alloys of cast iron, wrought iron, steel, copper and aluminium, and four descriptions of timber, these being tested across and along the grain. The results point to the fact that there is no general law governing the ratio of tensile strength to shearing strength. Crystalline metals, or those with little or no elongation, are shown to be stronger in shear than under tensile stress by from 20 per cent. to 25 per cent., and ductile metals may be anything from 0 to 50 per cent. weaker in shear than in tension. For timber the results showed the ultimate shearing strength to be from 33 per cent. to 53 per cent. of the ultimate tensile strength across the grain, and from 5·5 per cent. to 10·4 per cent. along the grain. The results are tabulated and plotted in convenient manner, and they ought to be appreciated by all who are interested in the strength of materials.

Electro-Chemistry.

IN his presidential address to the Birmingham Local Section of the Institution of Electrical Engineers, Professor Threlfall discussed several interesting problems in electro and electro-thermal chemistry. He stated that the fixation of nitrogen by electrical means would become an important industry in the future when the nitrate deposits in Chili begin to be exhausted. Nitric acid can now be made electrically at practically the same price as that manufactured from Chili saltpetre. The author described the investigations of Dr. Ludwig on the effects of heating carbon to very high temperatures under great pressures. When the carbons were in hydrogen at a pressure of 1,500 atmospheres it was found impossible to maintain a continuous arc between them, as the carbon at very high temperatures became non-conducting. As it cooled it became conducting, and so an intermittent arc was formed. When the carbon, at a pressure of 2,000 atmospheres, was cooled suddenly by means of a jet of water it was converted into a transparent medium, which however was not diamond. Professor Threlfall also described his own researches in the same field. Reasoning on the analogous relations between the properties of diamond and sulphur, he calculated that in order to make large diamond crystals it would be necessary to obtain pressures of at least 10,000 atmospheres. In this case the rate of cooling would probably be quite immaterial. He pointed out that the problem of making cubic carbon crystals was much easier, as at high pressures carbon vapour probably condenses in this form. These crystals would be useful as an abrasive. He also described the novel process invented by Elihu Thomson for making silica tubes. A carbon rod is buried in suitable sand, and a large electric current is sent through it. The heat developed round the conductor fuses the sand grains together, and so a tube is formed round the carbon which can easily be smoothed by a carborundum wheel. In appearance these tubes are similar to white vitreous earthenware, but they do not break even when heated red hot and dropped into water.

Tasmanian Blue Gum.

EXPERIENCE at the Dover Harbour Works has demonstrated in a striking manner the remarkable physical properties of the Tasmanian blue gum (*Eucalyptus globulus*), which is probably the strongest and most durable timber in the world. It certainly is denser than any other wood, having the specific gravity of 1.2, and is practically impervious to the attack of the teredo. These facts have only been recognised by timber experts within the last few months, and it is well that they should be generally known. So far as the works at Dover are concerned, the chief value of the blue gum piles from a constructive standpoint was that, while Oregon pine piles could not be driven in deep water subject to strong currents unless weighted at the end with iron, the piles employed required no such assistance. Further, owing to their immunity from injury by the teredo and to the great strength of the timber, most of these piles have been in continuous use for more than four years, and some of them have been driven three or four times in different positions. We learn from Mr. W. Heyn, the timber expert of Messrs. S. Pearson & Sons, that tests very carefully made show that the Tasmanian wood will sustain about double the weight that can be carried by English oak, and will even regain its elasticity after having been subjected to loads equal to the breaking weight of oak.

Cottage Exhibition, Cleveleys.

COTTAGE exhibitions seem likely to be one of the popular entertainments of next year. Following upon the competititive exhibitions in several different districts proposed by the Rural Housing Reform Association (already mentioned in our pages), we have now the prospectus of a cottage exhibition to be held at Cleveleys, in Lancashire, from July to September of next year, which professes to be a kind of continuation of that at Letchworth. We notice, however, that in offering prizes for four different classes of cottages, they have in the first two classes not specified any limit of cost, but offered the prize for "the best and most economical cottage, or (in Class II.) pair of cottages, to be built in accordance with the by-laws of the Thornton Urban District Council." This is a great deal wiser than specifying a sum which (as we saw at Letchworth) every competitor professes to be able to build his cottage for. In the other two classes the sum of 180*l.* is named as the limit of cost for a single cottage, and 350*l.* for a pair of cottages; this also seems to be a lesson from Letchworth, where the exhibition went to prove that a 150*l.* cottage of durable materials cannot be built except under specially advantageous conditions. We notice that among the conditions in regard to the competition in Classes III. and IV., the competitors will be required to declare, before the opening of the exhibition, the price (including builder's profit) at which, under similar conditions, they will be prepared to duplicate their exhibit. There is also to be a competition, comprised under Class V., for the best laid-out garden.

Trentham Hall, Staffordshire.

IT is stated that the Duke of Sutherland is about to present his seat in Staffordshire to the County Council for the purposes of a technical college. The mansion was built in the earlier half of the XVIIIth century after the model of Buckingham House, St. James's Park, but was considerably altered and improved by Holland for the first Marquis of Stafford (*obiit* 1803). Subsequent improvements upon an extensive scale were carried out by Sir Charles Barry, who refaced the cemented brickwork of the exterior, added the cornice and balustrades and the belvedere tower, and greatly embellished the details of the old building which contained the reception-rooms. Barry added also the grand entrance-hall and the semicircular corridor giving access to the state-rooms, designed the wing containing the private apartments, and, laying out the gardens, effected a notable transformation of the house and its surroundings. Trentham Hall is identified with the "Italian Palace" described in "Lothair" by Lord Beaconsfield, and its beautiful park, extending over 500 acres, watered by the Trent, is a favourite resort of holiday-makers from the districts around. Launcelot Brown laid out the greater portion of the grounds; his work at the house was superseded by that of his relative Holland—see Watts's *Seats*, etc., 1779, and Ackermann's *Repository*, 1824.

Rushen Castle, Isle of Man.

IN the course of some excavations which are being made for a structural repair of the ancient castle have been found the remains of a minting-house, with its furnace, broken crucibles, and some "Derby" coins. Rushen Castle, at one time the principal fortress in the island, was built in 945 by Guttred, son and successor of Orry, Prince of Denmark, and second of the twelve petty kings, called Orries, who reigned over the island. The castle, which in many respects is similar to that at Elsinore, is quadrangular on plan with square towers on the sides; the keep was converted into a prison, and within the area were erected lodgings for the lieutenant-governor, and buildings for the numerous courts appertaining to the civil government. A lofty embattled wall and a fosse surround the castle, which is further defended by a glacis of stone masonry built, reputedly, by Cardinal Wolsey during his guardianship of Edward, Earl of Derby. A drawbridge from the castle crosses the river which flows through Castletown, and the pit of the portcullis has recently been discovered. Sir John Stanley, K.G., obtained, *temp.* Henry IV., a grant, by liege homage, of the island and lordship of Man. His

descendants were the Earls of Derby, Lords of Man, and after the decapitation of James, seventh earl of that house, in 1651, his widow Charlotte (*née* de la Tremouille) gallantly defended Rushen Castle against the Parliamentary forces, to whom, however, the commander of the garrison, Receiver-General William Christian, ultimately surrendered.

Dowdeswell Gallery.

At the Dowdeswell Gallery is a collection of water-colours, under the title "At Home and Abroad," by Miss Winifred R. Roberts, a lady artist whose name is new to us, but of whom more is likely to be heard. They are mostly small works, all landscapes, some of them very slight and sketchy; but even the slighter ones show a true feeling for landscape effect, colour and composition. No. 1 in the catalogue, "Florence—a rift in the clouds," is one of the sketchy ones, but it at once arrests attention by its freedom and power. Two drawings on separate stands, larger and more highly finished than most of the others—"Sunset Time" and "Forest Lovers" (44, 45), show that the lighter and more hasty style of the others arises from no inability to produce a finished landscape picture. The "forest lovers" are the trees with bare stems which stand out against the sky. Among the others we may mention especially "First of the Morning—Riviera" (67), a beautiful effect of bright morning light among trees; "Havre" (18), a sketch of part of the port and the old warehouses; "Near Rougham, Norfolk" (27); "A Cheshire Stream" (40); "From Sunningdale Links" (62), a small sketch which has in it the making of a fine picture; and "The Fountain, Necton Hall, Norfolk" (81). The exhibition is a very interesting one, and quite justifies its existence.

Mr. Westlake's "Via Crucis" Paintings.

Mr. N. H. J. Westlake has been lately occupied with a series of pictures for a "Via Crucis," commissioned by Mr. S. Taprell Holland for the Church of the Holy Cross at Watford, which our readers will remember is one of the best-known works of the late Mr. J. F. Bentley. These were on view on Wednesday and Thursday. The "fourteen stations" are shown, painted in tempera on copper. In some cases Mr. Westlake has departed from the accepted tradition in painting of these subjects. The sepulchre, which is shown in the last picture, and which is usually represented as a simple cave, has been treated in a more architectural manner with a carved stone architrave to the door. This is probably a correct interpretation; Egyptian and Assyrian sepulchres are generally elaborate, and the Jews followed their custom a good deal in such matters. The pictures, which are quiet and dignified in conception, form an interesting series. Perhaps the most successful from the point of view of the painter are the two depicting the second fall and the crucifixion. The gilt frames used are copied from a special design made by the late Mr. Bentley, and are well suited to the pictures. There is also on view a fine design for a gold monstrance made by the artist for the Duke of Norfolk.

THE EXHIBITION OF ANCIENT ABRUZZESE ART AT CHIETI.

The fashion set by the promoters of the exhibition of ancient Sienese art, which was noticed in these columns a year and a half ago (*Builder*, June 11, 1904, p. 628), has been followed in other parts of Italy during the present year. I have already dealt with the exhibition of Italo-Byzantine sacred art at Grottaferrata (*Builder*, June 3, 1905, p. 592), and I now propose to describe shortly the exhibition of ancient Abruzzese art at Chieti, reserving for another occasion a notice of the exhibition of the art of the Marches which has been held at Macerata during the summer and autumn. The Chieti exhibition did not open until May 31, and closed at the end of October; owing to this, and to the fact that Chieti lies rather away from the ordinary tourist route, it has probably not been visited by many British travellers, so that an account of it may be of some interest.

The exhibits were divided into four main sections, devoted to (1) furniture and iron and copper work; (2) majolica; (3) goldsmith's and silversmith's work; and (4) tapestries, embroideries, and lace. A complete and comprehensive catalogue was published, the lack of illustrations in which is compensated for by the fact that a large number of excellent photographs of the most important objects have been taken by the official photographer of the Ministry of Public Instruction.*

The first section included a few fine *casse nuziali* (chests for containing the bride's trousseau) of the end of the XVIth century, with good carvings in relief, representing vintage and hunting scenes, etc., some very fine specimens of copper and iron work, the latter mostly belonging to a large collection formed by Count Cesare Pace of Massa d'Albe, near Avezzano, which is now in the possession of the Museo Artistico Industriale at Rome, and comprising locks and keys, door-handles and knockers, etc. There were also shown here a few of the finest tapestries from Pescocostanzo, which, strictly speaking, belonged to the fourth section, and three pictures on wood, almost the only representatives of pictorial art in the whole exhibition, one of which, bearing the date 1408, represents a somewhat rare subject—the Madonna quenching the thirst of the souls in purgatory with the milk from her own breasts. The author is unknown, but the expression of the Madonna is fine, and not at all of a conventional or borrowed type.

The second section was a very large one, comprising over 1,200 specimens of majolica, and occupying five rooms. The ceramic art in the Abruzzi, which had its centre in the village of Castelli, situated not far from the Gran Sasso d'Italia, about twenty-five miles south of Teramo, made its appearance rather later than at Urbino, Pesaro, and Faenza, and flourished when their art was already in decadence, in the XVIIth and XVIIIth centuries. The best artists, the Grue, the Gentile, the Cappelletti, handed on the tradition from father to son, and it is not by any means yet extinct, for a member of the last-named family showed a fine collection of modern imitations of the old style. Unfortunately for those who desired to study the history of the development of the ceramic art in the Abruzzi, it was not found possible to persuade the owners of the chief collections to allow the objects they exhibited to be dispersed; it was therefore necessary to abandon any idea of arranging the specimens in chronological order, except in Room V., which contained a selection from the Museo di S. Martino, at Naples. Room VI. was in great part occupied by the collection of Baron Aliprandi (196 specimens), while Baron de Riseis, of Naples, was another of the principal contributors. The lack of systematic arrangement was especially to be deplored, inasmuch as the origin of the school of Castelli is unknown, while, to the ordinary visitor, the study of the exhibition was rendered difficult and somewhat unprofitable. (See the remarks of Sig. Mariani in *Rassegna d'Arte*, 1905, 110.)

From the majolica the visitor passed to the third section—the goldsmith's and silversmith's work—and here it was plain that the promoters of the exhibition had not left the objects in the second section unclassified from any lack of capacity.

Here the work of each of the various schools was arranged in chronological order—the schools of Aquila, of Sulmona, of Teramo, and of Guardiagrele. Many of the objects shown bore a contemporary mark consisting of the name (abbreviated) of the place in which they were made, and sometimes an inscription giving particulars of the artist or of the person or persons who ordered the work to be done. They were exclusively objects of ecclesiastical use—mainly processional crosses, chalices, and reliquaries, with a preponderance of the former, of which, indeed, there were more than seventy, all of them fine specimens of their kind.

The earliest crosses (of the XIIIth and early XIVth centuries) belong to the school of Sulmona; they are made of thin plates of gilt bronze or copper, with a nucleus of wood, and preserve the traditional Byzantine forms. But progress in the goldsmith's art seems to have been here comparatively rapid, and the finest work of the school is to be seen in the chalice, paten, and pastoral staff made by one Ciccarello di Francesco, and given to the cathedral of Sulmona by Innocent VII. when he became Pope. The material is silver-gilt, and the execution is of great beauty, the small enamelled fields which form a part of the decoration being especially good. In the XVth century decoration in relief began to take the place of enamels, while the XVIth century witnessed the decadence of the school.

The school of Teramo has some fine works to show, ranging over a similar period; that of Aquila, on the other hand, appears to have begun later, most of its productions not being earlier than the XVIth century.

The climax of the goldsmith's art in the Abruzzi is marked, however, by the works of Nicola di Guardiagrele, an artist of the first half of the XIVth century. His finest work, the silver altar front in the cathedral at Teramo, begun in 1433 and completed in 1448, containing thirty-five panels with figures in relief, and many small enamels, was not sent to the exhibition; but four processional crosses, those of Lanciano (1422), Guardiagrele (1431), Monticchio (1433), and Aquila (1434), gave a good idea of his skill. They are very similar, but fine in invention, and of great beauty of execution; the figures are well modelled in high relief,* while the background is formed by decorative patterns in low relief; coloured enamels are also employed, so that the splendour of the whole and the wealth of detail are remarkable. Two monstrances, one from Francavilla (1413), and one from Atessa (1418), show Nicola at a slightly earlier stage of his development, in which his art is slightly less elaborate—two small Gothic tabernacles with delicate tracery.

As a painter he was not successful—a Madonna by him in the same room, on wood, cannot be said to be a work of any importance; but it is the only known picture from his hand. His last dated work is a silver bust of S. Justinus (1455), the patron of Chieti, preserved in the cathedral, much spoilt by restoration in the XVIIIth century.

From him sprang a whole school of artists, taking their name from Guardiagrele, a small town some twenty miles to the south of Chieti.

Of illuminated manuscripts there were very few—only four—but all of them of great beauty. The finest was the missal given to the cathedral of Chieti by Guido de' Medici, the second archbishop of the diocese (1528-1537), whose arms and name are inserted. It was executed either for Cardinal Giovanni

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* Copies of these and other photographs of objects and buildings of interest can be had at moderate prices on application to the Gabinetto Fotografico del Ministero della Publica Istruzione, 1, Via in Miranda, Rome. A catalogue of about 3,000 of these was published in 1904.

* It may be well to give a short description of the two crosses of Guardiagrele and Aquila, which are almost exactly alike, though in the latter enamel is more freely used. Upon one side the figure of Christ on the cross occupies the centre, the entombment being represented below, the Resurrection above, while at the two lateral extremities are the seated figures of the Virgin and St. John. Upon the other, Christ is seated in glory, with the four evangelists at the extremities of the four arms of the cross. Below the cross proper is a small building with niches containing statues, which forms the transition to the staff by which the cross was carried. The other crosses differ slightly in details, that of Lanciano, for example, having the burial and coronation of the Virgin respectively below and above the Christ in glory.

Borgia, nephew of Pope Alexander VI. (between 1492 and 1494), or, in part, at least, for Cardinal Ludovico Borgia (between December 22, 1536, and July, 1537).* The cathedral possesses another missal, which was formerly at Guardiagrele, illuminated perhaps by a local artist, of the end of the XIVth century. The other two were—a MS. of the Old and New Testaments, with notes and an index written by S. Giovanni da Capestrano (a Franciscan friar who led the crusade against the Hussites in Bohemia in the XVth century), to whom it was given by Pope Callixtus III., and a fine office for nuns' use, known as the Uffizio della Beata Cristina, and belonging to the Municipality of Aquila.

To the same section belonged the mediæval coins, medals, and seals, of which a small collection was exhibited.

The fourth section consisted of (1) tapestries, the best of which come from Pescocostanzo, twenty miles south-east of Sulmona, and belong to the XVIIth and XVIIIth centuries. The designs are, as a rule, decorative, but there was one curious specimen in the first room of the end of the XVIth century, with a representation of the Siege of Troy, formed by the superposition of stuffs of various colours sewn on to the fabric, some of the details being filled in in black on a white ground. (2) Laces and embroideries, of which, again, many belong to Pescocostanzo.

In both classes it is noticeable that the decorative patterns employed are often Greek patterns broken down.

A less important section (the fifth) was formed by sculptures in wood and stone, the former nearly all coloured and gilded, while the sixth, and last, section was devoted to modern reproductions of old lace, tapestries, majolica, ironwork, etc.—industries which seem to be flourishing and to be doing good work.

The exhibition was well housed and well arranged, and there was plenty of room to see the objects to advantage. But the municipal palace, in which it was held, is a modern building, with no pretence to architectural interest. It was, further, a pity that it was found necessary to displace and temporarily store the archæological collections belonging to the city, as there would not otherwise have been sufficient space. Archæology was, indeed, poorly represented, a fine set of the coins of Hadria (Atri) being almost the only exhibit of any note in this direction.

The exhibition was, however, of considerable importance and interest, and the promoters of it deserve much praise for their labours.

To the influence and active interest of the Archbishop of the diocese must be attributed the magnificent show of crosses, reliquaries, and other objects of value in the third section, a considerable proportion of which belong to the churches which are under his authority. THOMAS ASHBY, JUN.

* The former theory is sustained by Bertaux in the *Révue de l'art ancienne et moderne*, the latter by De Laurentiis (the president of the committee of the exhibition) in a commemorative number of a publication entitled *Feriæ Latinæ*, which appeared at Chieti on the occasion of the opening of the exhibition.

EXHIBITION OF SMOKE-ABATEMENT APPLIANCES.

IN connexion with the Conference arranged by the Royal Sanitary Institute and the Coal Smoke Abatement Society an exhibition of smoke-abatement appliances was held last week in the hall of the Royal Horticultural Society at Westminster. The exhibits were not very numerous, nor did they cover the whole range of the subject of smoke-abatement as outlined by the organisers of the exhibition. The only section which could be regarded as at all adequately represented was that of gas and its uses for lighting, heating, and cooking. Electrical applicances were not as conspicuous as one would have expected. There were few open domestic fires, and boilers and radiators for heating buildings by hot water and steam were not, as far as we could see, represented by a single exhibit.

The first stall was occupied by gas appliances made by Messrs. Parkinson and W. B. Cowan, to whom two bronze medals were awarded for gas-cookers and prepayment gas-meters. The South Metropolitan Gas Company exhibited a photometer for measuring high-power gas-burners. Two bronze medals were given to the Imperial Stove Company (Leamington Spa) for gas-cookers and for gas-stoves with removable enclosures, and the same company showed the "Cyclone" water-heater in connexion with a gas cooking-stove. The Cannon Iron Foundries (Deepfields, near Bilston) had an interesting collection of gas-stoves of various kinds, and received four bronze medals for gas-cookers, a gas washing-boiler for domestic use, a prepayment gas-meter, and a simple device for regulating the air supply to gas-stoves and fires. The Richmond Gas Stove and Meter Company (Warrington) had a large stand, divided by partitions into a number of rooms (including a hall, dining-room, drawing-room, bedroom, and kitchen), which were fitted with gas-stoves and fires of various kinds. Bronze medals were obtained for their griller with a firebrick radiator, and for the "Ilford" gas-fire, which is made so that the various parts can be easily removed, and is fitted with an adjustable nipple for regulating the supply of gas and air to the burner. The cast-iron stove, exhibited by this firm, for burning coke or anthracite, deserves mention for the simplicity of its design.

Messrs William Sugg & Co. showed their system of high-pressure incandescent gas lighting (driven by a hot-air engine) in operation, some of the lamps shown being of 1,000 candle-power; low-pressure incandescent gas-burners were also shown, and a bronze medal was received by the firm for gas-cooking apparatus. Messrs. Fletcher, Russell, & Co. (Warrington) had a large exhibit of gas-heating appliances, and received a bronze medal for their "Rapid" water-heater with safety-tap. Appliances for lighting and heating were also shown by Mr. Wm. Edgar, and at the next stand Mr. Joseph Nutting exhibited his ingenious gas cooking-stoves, fitted with V-shaped tubular copper boilers and overhead hot-water tanks, the waste heat from the stove being used to raise the temperature of the water. Messrs. A. E. Podmore & Co. exhibited (in operation) their "High-power Low-pressure Recuperative Incandescent Self-intensifying Gas Lamps"; this is a long name for a little fitting, but certainly the lamp appears to be both useful and economical; all the details have been carefully considered in order to render the lamp dust-proof and to increase the life of the mantles and chimneys. Mr. Thomas Potterton received a bronze medal for his apparatus for hot-water services heated by gas, and the Davis Gas Stove Company received another for gas-cookers with automatic gas-tap and by-pass; the same firm showed a large variety of gas-stoves and fires, one or two of which were of better design than usual. Messrs. Wilsons & Mathiesons (Armley) had also a good selection of gas-stoves and fires, among which two are worthy of special mention. The "Delft" is one of the best-designed gas-stoves which we have seen; the ironwork is simple, and the blue and white tiles add greatly to the effect. The "Sheraton" is not quite so pleasing, but has received a bronze medal for the ventilating grids with which it is fitted. A large "Model Smokeless Kitchen," fitted up by the Gas Light and Coke Company, was well worth seeing.

To the architect the most noticeable feature of the exhibits of gas stoves and fires is the wretched character of the designs in general. Nearly all are commonplace in shape, and covered with meretricious and meaningless ornament. Some of the exhibitors are evidently only just awaking to the fact that good design will "pay," while others still think that it has no commercial value. Here and there a tendency towards better things was noticeable, but, on the whole, the exhibition, however good it might be from the practical point of view, was artistically a failure.

The Westminster Electric Supply Corporation and the St. James's and Pall Mall Electric Light Company, assisted by Messrs. Rashleigh, Phipps, & Co., had a large exhibit of electrical appliances, including cooking stoves and utensils, "Prometheus" and other heaters, the "Stellite" Air-filter and Deodoriser for purifying and (if desired) perfuming the air required for ventilating dining-rooms, etc., and a great variety of ingenious appliances for other purposes.

Sir Charles Cookson exhibited an ordinary hob-grate burning gas-coke, the special feature being the method of lighting the fire by an iron pipe fitted with a Bunsen burner, and connected with the gas service. Messrs. Bratt, Colbran, & Co. showed a number of "Heaped" fires with different surrounds; the principal novelty was a surround of green bull-nosed Dutch tiles, 9 in. square, without any metal-work. The "Florence" grate was exhibited in operation by the London Warming and Ventilating Company, together with a number of stoves for burning anthracite and other fuel, and some gas-stoves. The "Florence" grate is fitted with rocking bars of peculiar shape, and at the time of our visit was burning anthracite coal satisfactorily. The Coalbrookdale Company exhibited the "Bostel" fire-grate in operation; this has a fire-basket hung on pivots, so that it can be tilted into various positions to alter the rate of combustion. Messrs. Doulton & Co. had a small exhibit of their faïence, etc., including a sunk fire without any metal except the bottom grate. A bronze medal was awarded to the Eagle Range and Gas Stove Company for their automatic draught-regulator and automatic indicator for dampers, applied to the "Eagle" kitchen range; they also exhibited the "Eagle Premier" domestic fire-grate with sliding doors for regulating the rate of combustion. A dog-grate and basket-grate were shown in operation by Mr. Samuel Firth, M.A., the inventor.

A small apparatus for washing the smoke from an ordinary domestic fire-grate was shown by the Mugnas Smoke-Washing and Fuel Economising Apparatus Company; an electric fan forms part of the apparatus, but adequate information about this and Mr. William Thomas's "Wildwm" smokeless chimney was not available.

Mr. Joseph W. Lovibond (Salisbury) exhibited various instruments for "measuring the colour of smoke," etc., and was awarded a bronze medal for his simple "Pocket Tintometer" for this purpose.

The Power-Gas Corporation Company received a silver medal for a model of the Mond Gas Plant, with ammonia-recovery apparatus, and Messrs. Crossley Bros. a bronze medal for their Suction Gas Plant.

Appliances for reducing the coal consumption in factory boilers were shown by a number of firms. Messrs. Edward Bennis & Co. (Little Hulton, Bolton) gained a silver medal for their Patent Stoker and Self-Cleaning Compressed-Air Furnaces for Lancashire boilers, and a bronze medal for their Improve Smokeless Chain-Grate Stoker. Another chain-grate stoker, made by Messrs. Babcock & Willcox (Renfrew) obtained a similar award. A bronze medal was also given to the Schwartzkopff Coal-Dust Firing Syndicate (St. Helens) for their Coal-Dust Furnace-Feeder. Smoke-consuming bridges and other appliances for Lancashire boilers were shown by Messrs. Hampton & Son (Loughborough), the British Fuel-Economiser and Smoke-Preventer Company (Bermondsey), the Horsfall Destructor Company (Leeds), the Smoke-Abolition Syndicate, the Courts-Turner Engineering Company (Manchester), and Messrs. Wilskemp (Wandsworth); and photographs and diagrams of other appliances for the same purpose were exhibited by other firms.

A bronze medal was awarded to Messrs. Sanders, Rehders, & Co. for their ingenious "Ados" Automatic CO_2 Recorder, which continuously and automatically records on a chart the percentage of CO_2 in the flue-gases of boilers; and the same firm's "Phœnix" Indicating and Recording Draught-Gauge is also worthy of mention.

Refuse-destructors were shown by the Horsfall Destructor Company (Leeds) and Messrs. Meldrum Bros. (Manchester), and ventilating appliances by Messrs. Matthews & Yates (Manchester).

This almost exhausts the list of exhibitors. We ought to add that, at the time of our visit, the awards in the lighting section had not been made.

MISSION ROOM, BEDFORD.—A mission room has been erected in Chandos-street, Bedford. Messrs. Mallows & Grocock superintended the erection of the structure by Messrs. Humphreys & Co., of Knightsbridge.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

AN ordinary meeting of the Royal Institute of British Architects was held on Monday at No. 9, Conduit-street, Mr. John Belcher, A.R.A., presiding.

Deceased Member.

Mr. Alexander Graham, Hon. Secretary, said it was with much regret that he had to announce the death of Mr. H. H. Collins, District Surveyor for the Eastern District of the City of London. He was elected an Associate in 1859 and a Fellow in 1877. There were very few architects who were not acquainted with Mr. Collins, for they came before him professionally in many ways, and especially in his capacity of District Surveyor. Mr. Collins was a familiar figure, therefore, to all of them, and they much regretted that he had passed away. He had, however, left a good name amongst them. For many years Mr. Collins took an active part in the work of the Institute, and had always been an ardent supporter of its best interests. He moved that a letter of sympathy be sent to the family condoling with them on the loss they had sustained, and expressing the full appreciation of the members of the Institute of the merits and work of the deceased.

Stained Glass.

Papers were then read by Messrs. Alexander Gascoyne and A. J. Dix on "Stained Glass," the following being abstracts :—

Mr. Alexander Gascoyne, referring to examples that remain of old stained-glass work, said that, without attempting to copy deliberately, many lessons may be learnt from it. If once we can catch the spirit and feeling that inspired the early glaziers, and work it into modern requirements, we shall be progressing towards perfect work. No better model could be desired than the beautiful arrangement of the best XVth century glass—*e.g.*, York Minster and Morley Church in Derbyshire. The windows in the north of the nave of Cologne Cathedral also afford excellent examples. Whether or not glass can be manufactured equal to the old glass is a matter of opinion; but by waiting and picking out the choicest sheets at the makers', and carefully selecting these, results can be obtained which will compare favourably with the early windows. It is the inequalities, variations of thickness and colours, and accidental markings which give the depth and brilliancy to the glass, and upon their judicious employment depends the success of the work. In good work the cost of the glass rarely, if ever, enters into the consideration of the glazier: he chooses the various glass as the artist does his colours. Beautiful results can be obtained by giving a free rendering of the early principles, and by designing foliage or ornament to take the place of canopies and bases, without losing the feeling or character of the old glass. It is immaterial what particular style is adopted provided we allow our originality to develop that style, and produce stained glass which for charm of design and colour will adapt itself to the character of the building. The assistance architects can give in suggestions for the general schemes of windows cannot be over-estimated; their co-operation has produced in many instances most successful results. When the profession as a whole demand really good work, and encourage designers who are known to have the interests of their craft at heart, there will be no lack of beautiful work. But so long as the greatest demand is for the cheapest article, it cannot be expected that the domestic or ecclesiastical stained glass of this country can improve. A stained-glass window need not necessarily be expensive. It can be made simple in design, and therefore not costly; but it does not follow that it is not in the best possible taste, and that the best material has not been used. The author impressed upon those designing stained glass for churches that the windows have a double mission—they should form a beautiful decoration and be devotional in feeling. The figures introduced should be an aid, not a hindrance, to devotion. Arouse the critical faculty, and no devotion is possible. To design some windows much careful consideration is necessary; really good work can hardly be done unless the artist is personally in sympathy with the object of the design. The author cited various errors in the treatment of windows due to the unsympathetic artist. The designing of a church window should be a work of love, and the artist will not be satisfied unless the symbolism truly interprets the teaching. Stained glass for modern dwellings should be designed to form part of the decorative scheme; the building itself should be seen before preparing designs. Rich colour schemes should be used with the greatest care. Simple treatment in white glass has been used by some architects with the most satisfactory results, harmonising admirably with any style of decoration. The importance of massing the design in domestic ornamented glass cannot be over-estimated. Referring to the full-size detail drawing prepared to give the architect an idea as to the general effect of the leads, the author pointed out that this was not a working drawing; a line drawing of the various shapes of the glass had to be prepared to guide the cutter in cutting the glass, and the glazier in piecing it together; unless every care was taken with this drawing all the architect's trouble might be lost.

Mr. A. J. Dix, after explaining the difference between stained and painted glass and defining the term "stained glass," said what he proposed to deal with was the making of what is generally understood by a stained-glass window—*i.e.*, the using of the material in such a way that shall interest and charm by a variety of design and combinations of colour in which it may be employed. A design for a stained-glass window may be in any medium and upon whatever material that most commends itself to the artist, even painted on glass in transparent colours, or of small pieces of the actual coloured glass itself put together like a mosaic. Nor is it even necessary that a design should be made at all; the cartoon may be drawn in the first instance, and a colour scheme for guidance in choosing the glass may be a coloured photograph of the cartoon, or a sketch to scale of the lead-work, coloured in, perfecting the scheme already in the mind and suggested by a possible rough sketch made before starting the cartoon. In the author's opinion the highly-finished competitive design for a stained-glass window is a mistake, a delusion, a snare. An attractive design is by no means a guarantee of a good window. The capabilities of a maker of stained glass should be judged by his finished work and not by design. One very important point to observe is the architectural fitness of the design—*i.e.*, its suitability as regards proportion, not only as a whole, but in detail. It should always be treated in such a way that will keep the window subservient to the architecture, about which there need be no fear if a strict adherence be observed to the natural limitation of the material. The position and size of window should be thoroughly considered, as much detail is often thrown away and a broadness of effect missed by over-elaborating a window which is only seen from a distance; also the amount of light one may safely exclude without over-darkening the interior of the building should be considered. Having referred to the cartoon and skeleton drawing, the author went on on to speak of the selection of glass—perhaps the most interesting and absorbing stage in the work—and described the various colours or tones giving the most satisfactory results, and the method of their employment and arrangement. The practice of superimposing pieces of glass held together in one lead in two or even three layers, called plating, though occasionally a useful expedient, the author considered should not be resorted to until every resource had been exhausted to obtain the required colour or tone. As regards the best tint of white glass, one could not go wrong in choosing a tint so often found in early glass—*i.e.*, a cool greenish hue. Describing the method of preparing and arranging the glass before painting, the author emphasised the importance of viewing the glass so prepared in a position against the light, as it will be in the window when finished. Now is the time to make any alteration desired. If the corrections are not made now before the work is painted, any offending pieces will be more reluctantly discarded at a later period. The whole making of a stained-glass window should be one of elimination, adding to, and correction, not only in the initial stage of the glass in its raw state, but as the work proceeds, altering the work to obtain the effect aimed at as it progresses. In the process of painting, and, in fact, at no period, should anything be taken for granted; the work should be viewed in a perpendicular position, and from as great a distance in the studio as possible, and no advance made until at each and every stage nothing suggests itself that could possibly be improved upon. The author went on to describe the process of painting the glass, the pigments employed, the firing, leading, etc.; and, in conclusion, he referred those who wished to make a study of stained glass to the works of Winston, Mr. Westlake's "History of Design in Painted Glass," Mr. Lewis F. Day's "Windows," and Mr. Whall's book in the "Artistic Craft Series."

Mr. J. D. Crace, in proposing a vote of thanks to the readers of the papers, said there were so many points touched upon that it was impossible to follow them one by one, but there were a few which he might be allowed to refer to. He thought that Mr. Dix had done very valuable service in bringing before them in so conspicuous a manner the action of the atmosphere and rain upon old glass, and he did not think any of them quite realised the great extent to which the surface of glass was changed, and, of course, the admixture of black, which was what it practically came to, had a wonderful effect in toning and harmonising the colours. He quite agreed with Mr. Dix that no amount of weather would make a bad window a good one, but there was no doubt that the action of time was a very kindly one upon the harmony of colour. One point which he had rather hoped would have been touched upon was the great importance in stained glass of producing what was generally known amongst painters as the palpitation of colour, by varying the depth of the colour individually used in any one mass. There was no doubt that a great deal of the jewel-like effect produced in the best windows was the result of varying the amount of power in the colour presented both in the one mass and in those which surrounded and contrasted it. The art of putting colour together in a glass window was a sort of special art, inasmuch as that one had to deal with colour in a more intense and pure scale than in almost any other branch of art. Of course, the painter toned his colour as he went on, but, under any circumstances, could not produce so rich a result as even a moderately brilliant painted window. The very beauty produced by brilliancy was also a sort of standing danger. One of the points of great value to those wishing to influence the colouring of windows which might be executed for them was that of having the glass when selected arranged on a plate-glass screen. That was a most useful and necessary thing. It was necessary for the artist engaged on the work and to everyone concerned in the responsibility for the production of a good window. It enabled, in the first instance at any rate, any slip of judgment in choosing the glass to be corrected before too much labour had been expended on it, and it undoubtedly had the effect of showing the artist the accuracy of his work in its crudest form, and therefore enabled him to make the corrections upon a proper scale. He supposed that few men who really cared about their work ever could finish a window, even if it was leaded up, without wishing to change a few portions of the glass. He would certainly recommend anyone who was interested in a window to carefully look at it against a light as nearly as possible like that which it was to be exposed to before it was finally soldered together. This final inspection would often save a great deal of trouble afterwards. He was glad to hear Mr. Gascoyne refer to the Florence windows, because he did not think that either architects or glass-stainers until recent years had given half enough attention to the lessons to be learned from Italian glass. Perhaps he ought to say glass in Italy, because there was a great deal of beautiful glass in that country which undoubtedly was produced by skilled Frenchmen brought there. At Florence and Siena a number of beautiful windows were produced from designs by Ghiberti, as well as by Ghirbaindajo. He would only say to any young architect who might be going to Italy for other purposes that any time he could spend on stained glass would be time well

devoted. It is characteristic of the guide-books for English tourists that stained glass, as an object of interest in any Italian church, is rarely mentioned. To read Baedeker no one would suppose that at Florence the Cathedral, Sta. Croce or St. Maria Novella were full of splendid glass—the same at Assissi or Siena.

Mr. G. H. Fellowes Prynne, in seconding the motion, said that Mr. Dix had stated with much truth that many of their churches had been ruined by restorations, but more, he thought, had been ruined by the bad glass put into them. If, as Mr. Dix had said, the artist in stained glass really would work with the architect, especially in church work, they would, he was sure, work together harmoniously, and the effect generally would be far better. It was that want of touch between the artist in painting and the architect that was so often felt in their churches. They found that after the church had left the hands of the architect one glass-painter was turned on and then another, and so a sort of competition ran round the church, for there seemed to be no unanimity and no unity of effect at all by such method, or rather want of method. He was sure that glass-painters must feel this themselves. Mr. Dix said that where he had the opportunity of putting in very elaborately-coloured windows it was a great opportunity, but he (the speaker) was not quite so sure of that. If there was too much of that single opportunity it was very often disadvantageous to other glass in the church, and to the general harmony of effect. The thing must be considered as a whole, and he was sure Mr. Dix would agree with that. When they got brilliant lights, as they would in the east, it was the greatest possible mistake to overdo the light glass. Of course, green glass, as they had seen, had been exaggerated, but he was not sure that it had not been an exaggeration in the right direction. As they all knew, white always exaggerated itself. If they put a piece of white next a piece of red the red must necessarily look smaller. The white really took away from, or rather spoilt, the proportion of the surrounding colours, so that little pure white could be used advantageously in stained glass—it must be toned with a very distinct tone of warm yellow or green. With regard to the cartoons Mr. Gascoyne had set before them, he might say that, in the cartoons and illustrations put before them that night, it would have been better if the lines separating the portions had been shown, because they become a very important feature in arranging the design. In all cartoons they were apt to be misled, for in the glass the lines were apt to come at very awkward places, and so it was obvious that in the cartoons they should be shown as much as the lead parts. The bars must be considered, for they were necessary to support the glass. Those who had been to Huy, in Belgium, must have been struck with the very long narrow windows with the single mullions running down, surrounding the apsidal east end of the cathedral. They were simply magnificent—not so much in the actual quality of the glass, but as to the colour introduced. The actual glass itself was not particularly good, but age had acted upon it to a certain extent, and the narrow and general massing of lines of colour were sublime in their effect. He agreed with Mr. Gascoyne in his idea of a man thoroughly entering into the symbolic feeling of what he designed, for this was absolutely essential. Unless the artist really had that feeling in him (and this applied particularly to church work) there would be but little to admire in his work, but they saw the mannerism of this or that stained-glass artist standing out in a window rather than the devotional or poetic effect he should try to get in the window. They often found artists who laid down a definite rule that they would not treat single lights with anything but single figures. He sympathised with them to a great extent when clients came and said, "We want a sea scene, or most elaborate pictures, brought into a space of about 9 in. or 12 in." That was hopeless in glass as a rule, and one sympathised with single figure treatment on the whole, but he thought it could be carried too far. He felt that there should be a certain amount of "lesson" or teaching in glass, whether historical, devotional, religious, or whatever it might be. If they had a single figure, it was a very usual thing in the XVth century to find some sort of story, martyrdom or event in the life of the individual. It was common to find some historical or interesting event depicted below on a smaller scale, and very often there was a little inscription which did tend to interest the ordinary beholder. That was, of course, wholly independent of the scheme of colour which one would try to carry through. He did feel that the more the stained-glass artist could throw the real devotional feeling and poetry into his design, the better he would make his work, and this was the same with artists and with architects.

Mr. G. Hubbard said it had occurred to him sometimes in glass-painting that if they had more white glass introduced they would have a better chance of judging the richness of the colouring. As a rule, old glass always appeared to be a medley of colour. He did not say that the effect was not extremely charming, but he did not think it possible to compare one colour with another. They could not compare the full power or intensity of blue with red, and he thought he was right in saying they could only compare all colours with white, and unless they had a sufficiency of white glass they did not get a true appreciation of the full intensity of the colours. He did not say that they must have a clear, transparent white glass which would be dazzling, but when he was at Chartres he was struck with the richness and beauty of the glass in the window of the cathedral. He had the opportunity of viewing it, not only from the interior, but he got on to the roof and examined the glass from outside, and he found that the glass had been washed over with what appeared to be a sort of thin cement-wash. It occurred to him at the time that possibly the great richness of the colour was due to this cement-wash, and he would like to know whether that wash was put there to preserve the glass or whether to add to the richness of the colouring.

A member asked if Mr. Hubbard referred to the large figures in the nave.

Mr. Hubbard said it was XIIIth-century glass, but it was long ago that he saw it, and he did not remember which window it was.

Mr. H. Townsend said that Mr. Dix had referred to the American system of superimposed glass, and, while admitting that it produced certain beautiful effects, he said that it was not an entirely legitimate way of carrying out the work. Mr. Dix left it at that point, but he (the speaker) would like to know why it was a particular offence to produce by the means of glass, whether superimposed or singly, the best effect one could, and why one should hesitate to use double thicknesses if one thought one was going to gain in colour effect and value.

Mr. E. W. Hudson said that, with regard to the disfigurement of the glass by the saddle bars coming across the design, he believed it was a fact that the cames were made so well that it was almost unnecessary to introduce these cross-lines which naturally would be a disfigurement. He believed also in large windows it was the custom to adjust the bars rather to suit the principal lead lines. As to superimposed glass, he believed it was the fact that there were grades of thickness and grades of density of colour in the same glass, so that they could select them graded, which would give much the same effect as superimposed glass would give. They must have been struck with the beauty of the drawing of the cartoons shown, and also the executed glass, but one could not help thinking that they were intended to be viewed from very close down. With regard to the glass, it had to be placed at a much greater height if he supposed there was nothing amongst the cartoons showing the strength of the lines which would be adopted for 30 ft. or 40 ft. high. He was much struck many years ago with the painted glass in the Abbey Church of St. Denis, and thought that a magnificent effect was produced, but some years later he went with strong glasses and looked at it, and he never saw a more dreadful instance of drawing representing the human form divine than in that glass.

The Chairman said it was important, as was pointed out by Mr. Gascoyne, that in church windows there should be a strong devotional feeling in the work. By that he took it that Mr. Gascoyne meant there should be no disturbing element in them, and that anything which seemed to suggest a problem to be solved was a mistake in a place of worship, for immediately the mind would be occupied in trying to solve the problem instead of being impressed by the beauty and quietness and silence of the windows. Another matter which had been mentioned, and which was of importance, was that the building should be first seen before the glass was designed. If the stained-glass designer had no idea of the aspect or the height of the window from the ground he could not by any possibility design a window suitable for its position in the building. He had had experience of a case where some stained-glass windows were wanted for a staircase which was abundantly lighted, but was chiefly lighted from a sky-light above. The windows were some 10 ft. from another building, so that there was no direct light upon the staircase windows. There was a competition for these windows. He knew nothing about it at the time, but several eminent artists were requested to send in designs, and it happened that the selected artist had not seen the building, and had taken no particulars even of the size of the opening, and when the window was sent down completed it was at least 15 in. too short, and the effect was disastrous. The work was entirely a failure, and the committee called him (Mr. Belcher) in to know what was the matter. The artist said that too much light had been supplied on the staircase, and that they should put electric light behind. The whole intention was spoiled, and he hoped eventually to have the window removed and proper glass put in. When he was a young man he imagined that he could design stained glass and do everything necessary in a building, and he did design some stained-glass windows, but was glad to say he had since removed them. Mr. Dix mentioned that it was important that the question of scale should be considered; that in the examination of a building and in noting the scale and general disposition of its parts the artist should be guided in the scale of his figures. The history of stained glass had not been much gone into, but it had been rather hinted that the XVth-century glass was that which they should endeavour to copy. He felt very strongly that, if possible, all their work should be designed in the XXth-century style, and that they should avoid, as far as possible, mere imitation. If they could develop the beauty of stained glass, by all means let them do it, and adopt every method and every feeling that came to hand, and also endeavour, as far as possible, to make it suitable for the positions which it was to occupy.

The motion was heartily carried.

Mr. Gascoyne replied, and said that, with respect to the question of cement-wash outside the windows of Chartres Cathedral, what Mr. Hubbard saw was no doubt the effect of age, and was not cement at all. It looked just like cement, but it was simply the effect of age corroding the glass on the outside. They would notice the same at Cologne. With regard to the work at Florence, they could see one light in the Duomo Museum at the back where they had the opportunity of examining closely the glass which looked so well in the clearstory window, and they would be struck with the difference.

Mr. Dix also acknowledged the vote of thanks, and said that, in regard to the question of superimposed glass, he had given a strong reason in his paper for not liking it. It appeared to him that the method was not quite playing the game. If a man could not get with one layer of glass the effect he wanted in his stained-glass window, he thought he had better leave it alone. That idea would certainly be borne out if they wished for their work to be looked at when time and atmosphere had done their work. If they wished their work to remain until, as in the case of the York windows, it had to be placed between sheet-glass, then it would be impossible, with the superimposed method, for the glazier to put it together. What was supposed to be a cement-wash was absolutely due to the effect of the atmosphere. It had all the appearance of being washed over with cement, but it was simply decay.

The Chairman announced that the next meeting, for the election of members, would be held on January 8.

THE ARCHITECTURAL ASSOCIATION.

An ordinary general meeting of this Association was held on Friday, last week, at No. 18, Tufton-street, Westminster, S.W., the President, Mr. E. Guy Dawber, in the chair.

The minutes were read and confirmed, and some nominations were read, after which the following gentlemen were elected members of the Association, *i.e.*, Messrs. H. E. C. Claydon, R. N. Hewitt, G. T. Jell, F. J. Daniel, S. Davies, W. G. Wales, and Sir F. L. Rupert Ford, Bart.

The President announced the reinstatement of Mr. R. Hebert.

Mr. Tanner, hon. secretary, then announced the following forthcoming meeting:—The Discussion Section, January 3, when a paper would be read by Mr. P. J. Turner on "The Houses of Parliament" at 7.30.

He also announced the following donations to the library:—

"A History of Architectural Development," Vol. I., by Professor F. M. Simpson. Presented by Longmans, Green, & Co.

"Gothic Architecture in England," by Mr. Francis Bond. Presented by Mr. B. T. Batsford.

"Practical Trigonometry," by Professor Henry Adams. Presented by the author.

"The London Building Acts, 1894 to 1905," by Mr. Bernard Dicksee. Presented by the author.

A vote of thanks was accorded to the donors.

Church Towers and Spires.

Mr. W. H. Bidlake then read the following paper on "Church Towers and Spires," which was illustrated by a large number of excellent lantern slides:—

"In a survey of the development and design of English mediæval towers and spires, the prospect which stretches away before the mind's eye from Tudor to Saxon England is so extensive, and it may be viewed from so many standpoints, that it would be impossible in an hour's paper to do more than refer broadly, in some cases even superficially, to the more salient features which arrest the attention. Moreover, the subject is so attractive, and is capable of being attractively illustrated, that many have taken in hand to set forth in order its principal features, and I shall not attempt to adduce any new facts or invent any new theories. It is difficult, indeed, unless one is content with minor examples, to find any illustrations which have not already been given in that excellent series of drawings in "Wicke's Towers and Spires," which, since its publication in 1855, has been regarded as the standard work on the subject. And it is a subject which is so dependent on illustration that I shall rely on the lantern photographs rather than on any words of description.

I will first illustrate the historical evolution of the tower and spire, and its employment in connexion with the rest of the building, and then consider some special points relative to tower and spire design.

The typical position for the tower in an English church is the centre of the west end, making, with the western terminations of the north and south aisles, a symmetrical façade.

Usually the tower stands free on its three sides, but occasionally the aisles are brought up to its western face.

As the tower in this position forms the western termination of the nave, it contains on its west face the central doorway and the west window.

The whole composition is evidently intended to impress the worshipper as he approaches it from the front. It is the frontispiece, behind which the church lies more or less hidden.

This is still more the case with the typical cathedral front, where two towers flank the central doorway, and the composition is still less suggestive of the sectional outline of the nave and aisles behind, especially when, as in so many French examples, the central gable is masked by a horizontal arcade.

It is not unlike, in its intention and conception, the façade of an ancient Egyptian temple, which masks the building behind, and in which the pylons flanking the central doorway may be compared to the western towers of the Gothic cathedral.

Occasionally, indeed, a still more magnificent façade is presented, either by extending the screen beyond the towers to flanking north and south turrets, as at Lincoln, or placing the towers themselves outside the aisles, and decorating the extended front with splendid sculpture, as at Wells, or, grander still, the arcaded caverns of Peterborough.

At Exeter twin Norman towers form the transepts, while Ely is the only example of a cathedral with a western tower on the central axis, a position so common in the parish church.

Some of our cathedrals have no western towers now remaining, as Winchester; and poor, indeed, do their fronts appear in comparison with those we have been considering.

The dome of the Byzantine and the lantern of Spain and the South of France becomes, in Normandy, the central tower, and no Norman or Anglo-Norman cathedral was complete without it. In France the loftiness of the high vault compelled her architects to substitute for the central tower the elegant, but far less imposing, timber flèche; and if, after contemplating the wonderful loftiness and airiness of her cathedrals, we return dissatisfied with the low proportions of our own, let us find our consolation in the fact that this very lack of internal height has secured for us the retention of the central tower.

The typical Norman cathedral, then, had both central and western towers, as at Southwell, and it is only when all three are present that the English cathedral realises its full majesty, and becomes, in fact, one of the grandest works of man.

It is possible that each tower was intended—after the Norman period—to carry its spire. Not a few had timber and lead spires at one time, which have since been taken down. Lincoln once had small timber spires on the western towers, as shown on old prints, and a spire no less than 523 ft. high on the central tower. It is possible, too, that Peterborough was intended to carry spires on all its five towers, but Lichfield alone of all the cathedrals retains her triple spires, and these endow her with such grace that she becomes one of the most beautiful and distinctive in the country.

In the smaller Anglo-Norman churches a central tower, or, rather, one which occupies an analogous position on the central axis at the eastern part of the nave, is not uncommon, as at Iffley.

Occasionally a western tower also exists, and this tandem disposition recalls the twin towers so common in Auvergne, as at Issoire and Erioude and in other parts of central France, although it is improbable that there is any historical connexion between the two types.

Of the Saxon towers still remaining, many of them are in the centre of the west end, as at Earls Barton, and it seems not improbable that the western position of the tower in subsequent styles was due to a continuation of this essentially English arrangement; a supposition rendered the more probable by the rarity of central-western towers in Normandy.

If we pursue the subject backwards, and ask what was the origin of these Saxon towers, we are led to the larger subject of the origin of the Romanesque tower, and to a consideration of those at Tours, Ravenna, Milan, and Central Syria. But this would lead us astray from our present subject.

Although the central-western position of the tower is the typical one for the parish church, the tower is occasionally found on one side, as at St. Mary Redicliffe, Bristol, or All Saints', Stamford. At Wisbech, the tower is almost detached from the church, and in the surrounding district may be found several instances in which it is wholly so.

The magnificent tower of West Walton, some few miles away, forms, in fact, the lych-gate of the churchyard.

Detached towers are also a local peculiarity of Herefordshire.

While in an overwhelming majority, the tower plan is square, the octagon is occasionally found, as at Stanwick; and in Norfolk and Ireland the round tower is frequent, in the former due to the use of flint and the difficulty of building quoins in that material.

Both Saxon and Norman towers must have been roofed with wood, and a simple squat pyramid, like those which the late Mr. Christian reconstructed on the Norman west towers of Southwell, must have been very frequent, because their construction would be the simplest and most direct.

But timber spires must also have existed, for they are represented in old manuscripts. Their form, in all probability, resembled the ancient timber spires still existing at East Meopham and Newhaven, which, though not of actual Norman date, probably reproduce the design of the Norman originals.

This form of spire is octagonal in its upper portion, the diagonal sides bending out below towards the angles of the tower, which they meet in a point. Its shape is due to the timber angle-pieces of the spire being framed into a collar, which is supported by the hip rafters of the lower spreading sides.

This type of spire is common in Germany, as at Erfurth, and still more so in Scandinavia, as at Alskog and Bro, in the island of Gotland.

Its character varies considerably according to the relative slope of its upper and lower portions.

A fine modern example is that of All Saints' Church, Margaret-street, by the late Mr. Butterfield.

Both this form of spire and the squat pyramidal roof were subsequently translated into stone, and the former may be found as late as the Perpendicular period, as at Bythorn.

We may also suppose that an octagonal timber spire arose sometimes from the flat upper surface of the cornice, and gave rise to that form of spire so common in France, of which Christ Church, Oxford, is an example.

This form, however, like the simple pyramid, was destined to die out, while the broach spire which, if it did not originate in Northamptonshire, was certainly developed in that district, took its place in the Lancet period.

The broach spire is, in the main, a copy in stone of a timber roof, and its cardinal sides come down over the sides of the tower and end in dripping eaves, but the broaches which fill the triangular spaces between the diagonal sides of the spire and the angles of the tower are of true stone construction, and, whether their sloped sides meet those of the spire high up or low down, will determine very much the general outline and character of the spire.

At first these broach spires are of an obtuse angle, and have bold spire lights. They appear as veritable stone roofs, and, whether they rest on a slight cornice or corbel table, always overlap the walls of the tower to form dripping eaves. One of the noblest spires of this type is to be found at Frampton, a small village near Boston, hidden among trees.

In the towers of the Lancet period buttresses are sometimes employed in pairs at the angles—the diagonal buttress comes later—but they stop at the belfry stage against the flat pilasters which have been retained from the earlier style. The staircase turret likewise stops short either at the belfry stage or the spire eaves, and a corbel table is carried between the angle pilasters so as to offer an unbroken square as seating for the spire.

In some cases, as at Ely, Walsoken, West Walton, and Sutton St. Mary, bold octagonal buttresses occur at the angles of the tower, and reach to the cornice. These must either have been finished with pinnacles, as at Oxford Cathedral, or have carried timber spirelets in conjunction with an octagonal timber spire over the tower, as at Sutton St. Mary.

Possibly towers of still earlier date were similarly treated, for the Normn central towers of Norwich and Tewkesbury probably had pinnacles or spirelets at the angles, and Tewkesbury once had a timber spire.

With the exception, however, of an occasional saddle-back roof, it is improbable that any towers were considered complete in the Lancet and Geometrical periods without a spire either of timber or stone.

As the style advanced the broach spire became more acute and loftier, and the broaches and spire lights less in proportion. The broaches, moreover, began to take to themselves pinnacles either at the extreme angle of the tower or at their apex against the spire, or mid-way up the slope. The central spire of Lichfield has two pinnacles on each broach.

Next, the bottom spire light was no longer placed on the cornice, but higher up the spire, and the upper spire lights more frequently alternated on the diagonal and cardinal sides. Their gablets were frequently crocketed, and niches with crocketed gable heads were placed at the apex of the

broaches lying back on the spire, as at Ketton and St. Mary's, Stamford.

The spire itself becomes ribbed or ribbed and crocketed along its angles, and has an occasional horizontal band or moulding, and more pronounced mouldings and a more definite cornice mark its junction with the tower.

At length a momentous change takes place—cornice and dripping eaves are alike abandoned, and a passage is made round the base of the spire; probably a practical innovation to facilitate the repair of the spire; for spires were more frequently struck by lightning in those prelightning-conductor days than at present. For safety's sake the passage required a parapet.

Although the parapet might slightly overhang the faces of the tower, being carried forward on the cornice, especially when pinnacles supported it at the angles of the tower, yet it was necessary to set the spire and its broaches in a little so as to allow room for the passage. And thus commenced the shrinking of the spire.

Woodford is a simple example of a parapet carried round a broach spire, and, near by, Denford, across the meadows of the Nene, has a parapet carried round a spire of the timber type.

Some very fine steeples belong to this transitional type, and pre-eminent among them is Grantham. Not far away is Newark, evidently by the same architect.

Heckington is a particularly noble steeple of this type. It is of strong outline and fine proportions, and its large hexagonal pinnacles admirably support the lines of the spire. It has but little ornament—a little crocketing on the buttress gablets, and some carved bosses in the cornice, and the belfry lights are single. It is one of those masterpieces which are independent of any added ornament for their beauty.

In the simple type of broach spire the lines of the broaches satisfactorily carried down those of the spire to embrace the angles of the tower, and, whether seen in front or diagonal elevation, there was a complete unity between tower and spire.

Not so with the parapet spire. The first effect of the parapet is to introduce strong horizontal lines between tower and spire. Its second is to cause a certain shrinking of the spire to allow a passage round its base. The third is still more important, and more pregnant of future development.

It results from the fact that, while the apparent breadth of the tower increases from the front to angle elevation in the ratio of the side to the diagonal of a square, that of the octagonal spire remains the same. Hence the spire which seems in correct proportion to the tower on front elevation appears too narrow and shrunken on the angle elevation, and the angle pinnacles in like manner appear to have moved away from it, leaving a disconnecting and awkward gap in the skyline.

As long as the broaches were retained their full height behind the parapet, as at Newark, this difficulty hardly presented itself.

But hardly had the parapet been introduced when the broaches began to shrink, and, ultimately, to disappear behind it.

Then commenced a series of experiments to overcome this double difficulty, namely, the disconnecting effect of the parapet between tower and spire on the one hand, and the difference between the apparent proportions of tower and spire on the front and angle elevations on the other.

The most evident solution, and the one that was at first attempted, was to make the angle pinnacles of the tower so massive and tall that the tower should seem to be carried up into the domain of the spire, and the pinnacles themselves should, on the angle elevation, appear to support the spire and fill up the gap between its sides and the angles of the tower.

These large pinnacles begin to appear, in fact, before the broach has quite disappeared, as at Heckington.

Other fine examples are to be found in St. Mary Redcliffe, Bristol, and the western towers of Lichfield Cathedral.

The disadvantage of this arrangement is that the pinnacles tend to block the passage round the spire.

At Oakham the pinnacles, though still massive, are rather smaller, and are connected with the spire by horizontal masses of masonry, which are pierced so as to form bridges across the passage. It is the embryo of the subsequent flying buttress.

The second method adopted was to keep the tower pinnacles comparatively low and subordinate them to an inner range which filled the space between them and the spire, as in the central tower at Chichester, or the more magnificent one of Salisbury.

In fact, in this grand example, the problem seems solved. The inner pinnacles are a mean between the outer pinnacles and the spire, and the eye, following upward the lines of the tower, passes by easy steps from angle pinnacles to inner pinnacles, and from these to the spire itself. Tower and spire are welded together, and the unity of the broach steeple is restored. Moreover, the angle view is equally satisfactory with that in front.

Yet the parapet is not sacrificed; the tower and spire retain their respective characters, and there is not that confusion between them which one finds sometimes on the Continent, as at Freiburg and St. Stephen's at Vienna, in which it is impossible to say where tower ends or spire begins.

An elaboration of this idea is to be found at St. Mary's, Oxford. Here, in place of the tower pinnacles, each of the pair of buttresses at the tower angles carries an elaborate gabled and crocketed canopy over a sculptured figure, and the inner pinnacles are in two stages, with similar elaborate ornament, the whole combining with the spire lights to form a cluster of richly-decorated gablets and pinnacles, from the centre of which the spire rises.

This type of clustered spire reaches its fullest expression in the south flanking tower of the west front of Peterborough, in which graceful triangular spirelets rise between tower pinnacles and spire having one side of the triangular base adhesive to the spire, and the opposite angle carried by the tower pinnacle, and allowing a clear passageway beneath. The height of the spirelets is so arranged that their apex is on the line drawn from the apex of the tower pinnacles to that of the central spire.

In contemplating such an example as this one recognises that the central spire is only one of a cluster, and has entirely ceased to represent the tower roof, as in such early broach spires as Frampton. It has, in fact, ceased to be an essential part of the tower, and has become only an ornamental accessory. It is, therefore, sooner or later, doomed to obey the inexorable law of extinction of useless members.

But there was yet a third way of connecting angle of tower with spire, and one which became very popular with the Perpendicular architects. It is to put a small pinnacle at the tower angle, and connect it with the spire by a flying buttress; a poor contrivance, but serving in some degree to carry the eye over the hiatus between tower-pinnacle, and spire on the angle elevation.

The buttress abuts against the centre of the diagonal side of the spire, and seems sadly to lack articulation, and its particular form suggests resistance to a thrust, which, if it existed, would make short work of buttress, pinnacle, and all.

Higham Ferrers and Rushden may be taken as typical examples of this method. Also Moulton and Whittlesea.

The magnificent steeple of Louth is the only one in which the flying buttress seems worthy of its position. No; I am forgetting, there is one at Newcastle, in which the flying buttress has run away with the spire.

At Middleton Cheney an inner range of small pinnacles is introduced, and these are connected by flying buttresses, both with the spire and the tower pinnacles. It suggests a tentative arrangement which, in the neighbouring church of King's Sutton, is fully worked out. Here the inner pinnacles are of fine proportions, while the tower pinnacles are mere outliers, but connected by a strand of stone which rather suggests open tracery than a flying buttress. This really belongs to the group of clustered spires, and is very elegant and beautiful.

We now come to the fourth and last method of uniting tower and spire—by the interposition of an octagon.

This occurs in its most rudimentary form at Abingdon, which consists in little more than setting the spire on an octagonal drum, and marking the junction by an embattled string.

At Exton, a beautiful little steeple, amid beautiful surroundings of wood and park, affords an excellent example of the employment of the octagon. The tower pinnacles finish in miniature embattled octagons, which assists in harmonising tower and spire and giving breadth to the design. The octagon, however, seems so evidently to exist at the cost of the spire that the latter looks somewhat strangled by it.

But you will already have forestalled me, and arrived at Coventry first. It is impossible to speak of the association of octagon and spire without immediately thinking of St. Michael's.

Whilst elsewhere in the Perpendicular period they were more busy with towers than spires, the Coventry people seem to have reared their steeple as a vindication of the spire and a protest at its increasing neglect.

And a very noble steeple it is, although it excites our wonder as a *tour-de-force* as much as our admiration as a design. The truth is it looks a little too unstable; attenuation is written on every part; the octagon seems balanced on the tower, the spire on the octagon, and the weak ogee flying buttresses add very little to the sense of stability, and rise too high from the tower pinnacles, which are themselves weak in outline.

The corona of open panelling at Patrington serves a similar purpose with the octagon, and may almost be regarded as such. A fine design is here marred by the ridiculous straddle tower-pinnacles and their flying buttresses, and the poor belfry windows.

If at Exton the octagon is taken out of the spire, at Wilby it is no less evidently taken out of the tower. The three stages are too equal, and the tower is low in proportion, and appears crushed by its load.

It is on the same lines as this steeple that some of the large German steeples are designed, to which I have already referred, and in which the tower passes insensibly into the spire, as at Freiburg, St. Stephen's at Vienna, at Cologne Cathedral.

At Graffham, near Huntingdon, the angles at the upper part of the tower are cut off by squinches carrying pinnacles to form an octagonal base to the spire, an arrangement of which Bloxham may be considered as an elaboration.

But if it is true that in the Perpendicular period some of our most famous spires were erected, it is no less true that it is the tower which is characteristic of the style.

For by this time the spire had come to be regarded so entirely as an ornamental adjunct and finish to the tower that there was no reason why, if the design required it, it should not be dispensed with altogether. The tower, too, is more in keeping with the pervading rectangularity of the architecture of the day.

Moreover, the spire was costly, and involved a more difficult problem in design and construction than a square tower with parapet pinnacles and a flat timber roof.

Not that one would wish to disparage the late Gothic tower, for it shares with the fan tracery vault, and the open-timber roof the honour of demonstrating to the world the vigour and originality of the English Perpendicular school.

That the Perpendicular builders were sensible of the value of the spire as a crowning feature of the design, the steeples of Coventry and Louth are sufficient witness, and they not infrequently erected timber and lead spires over towers which were otherwise complete without them, as, for example, the three towers of Lincoln.

As Northamptonshire and Lincolnshire, with Peterborough as centre, is the home of the spire, so Somersetshire, with Glastonbury or Wells as centre, developed the most important school of tower design, although Norfolk and Suffolk may lay claim to many excellent examples.

The Somersetshire type is sufficiently distinctive, notwithstanding considerable variation in individual towers, that it can be at once recognised.

Of lofty proportions, these towers are usually divided into three stages by string courses, and the buttresses, which are in pairs, are set in a little way from the angle of the tower, allowing the string course to peep out, as it were, at the angle. The buttress weatherings usually line with the strings, and carry crocketed pinnacles set

diagonally, and with one angle engaged with the buttress face above.

Similar pinnacles flank the windows of the belfry stages, pierce the centre of the parapet, or are employed at the tower angles with larger pinnacles to form a complex pinnacle system, in which at times an isolated pinnacle is hung out at the angle, supported by a grotesque below, and united above by a strand of stone to the main pinnacle, as at Huish Episcopi.

The parapets are usually embattled, and have pierced traceried panelling, and occasionally, as at Glastonbury and Taunton, are very elaborate. In these cases the angle pinnacles are usually of open tracery work.

The lowest stage of the west face is occupied by the Tudor arched door, enclosed within a square frame of mouldings, which are sometimes the plinth mouldings brought over. The west window is placed immediately over the door or at a short distance above. Niches for sculpture are often freely used for surface decoration, and the coupled belfry windows are usually filled with a stone lattice of pierced quatrefoils in place of the usual oak louvres. Occasionally, too, sunk quatrefoils form decorative bands beneath the main cornice or intermediate string courses.

There are several fine towers outside the Somersetshire district which belong, more or less, to this type, as at Wrexham and Evesham.

St. Neots, near Huntingdon, has an unusually fine tower for the district, with certain points of resemblance to the Somersetshire towers. But the strings and buttress weatherings do not line, the engaged pinnacle is of different design, and the belfry lights are insignificant, and go far to spoil the beauty of the design. The central portion of the parapet is carried up higher than the sides in a manner peculiar to this eastern district, other examples occurring at Huntingdon, St. Martin's, Stamford, and Wisbech.

A smaller, though not less beautiful, tower is to be found at Tichmarsh, in the land of spires, decorated with quatrefoil bands and gabled niches, and crowned with a forest of pinnacles.

Here, as in many east county towers, a band of quatrefoils is carried beneath the plinth weathering.

There are a few towers carrying octagonal lanterns, as at Irthlingborough. At Lowick the whole design is of excellent proportion, and the octagon ends in a corona of pinnacles.

But the grandest example is to be found at Boston, irreverently called "Boston Stump."

The central tower, that crowning glory of the English cathedral, differs from those hitherto described in that it stands on four isolated piers hidden by the adjoining roofs. As a consequence the bold angle buttresses are dispensed with as there is no support for them, and the tower rises to the parapet without a break in its vertical lines. A comparison between the central and western towers of Canterbury will emphasise this point.

Very frequently the central tower carries an octagonal thickening at the angles which carry the angle pinnacles, as at Lincoln.

The western towers of this cathedral, though of rather later date, are designed on similar lines.

Sometimes small diagonal buttresses are employed, feeling out, as it were, towards the angles of the crossing, as at Gloucester, and its reduced and improved copy at Malvern.

Inasmuch as the central tower has to span the nave and transepts, it is necessarily broad, and, as it rises only two stages above the roof, its chief characteristic is its imposing mass, as at Hereford and Wells.

Hedon is a fine example of a central tower over one of the larger churches, and Melton Mowbray over one of the smaller ones.

Many of the features of tower and spire design have already been noticed in the survey of their development. It remains to examine one or two points more in detail.

With the exception of the central towers most towers have an upward diminution, not only to give them an air of stability, but, when they carry spires, to counteract the optical illusion of their spreading outwards at the top, due to slope lines of the spire.

This diminution is obtained in various ways: By setting in each stage on the string course from the stage below, as in the Saxon towers and the Lancet towers of West Walton and Walsoken; secondly, by the diminution of buttress projection, as in the vast majority of towers; and thirdly, by giving a batter to the tower, or to the buttresses, or both, as at Market Harborough.

Small towers occasionally have no buttresses; the majority have pairs of buttresses, either exactly at the tower angle, as at Grantham, or set in a short distance, as in the Somerset towers; a less number have diagonal buttresses, while not a few have an octagonal thickening at the angles. St. Margaret's, Leicester, has diagonal buttresses set upon the usual pair of buttresses below.

Of the octagonal angled towers Magdalen Tower, Oxford, is a fine example.

This tower also illustrates an important point in tower design, the severity and plainness of the lower stages, and the increase in lightness, elaboration, and ornament, towards the top.

The fenestration of the Lombard towers followed this principle, and Giotto's campanile is also an excellent example of it.

Lancet towers, on the other hand, are frequently covered with tiers of arcading over their whole surface, which extend even round the octagonal angles, as at St. Mary's, Stamford, and West Walton.

Raunds has a unique decoration of zigzag weatherings, with the angles decorated by sunk quatrefoils.

The staircase turret has already been referred to as stopping beneath the broach spire, or even below the belfry stage.

Sometimes it is incorporated with the angle buttresses, as at Heckington and Grantham, in the latter case carrying a larger pinnacle than the other tower angles. At other times it projects boldly from the middle of the face of the tower, or near one angle, or at the angle itself, and stops below the parapet, or is carried up above it. In the latter case it is often finished with an embattled top or spirelet.

Next to the main lines of stages, buttresses, and strings the belfry windows claim our attention. They are, as it were, the eyes of the tower, and a tower without them does not look intelligent.

Single belfry lights are to be found at all periods, from Polebrook and Heckington to York and Boston. These are often supported by blank panels at the sides, as at Denford and Frampton, or, to take later examples, by the traceried panelling of St. Peter's, Derby.

But the general rule is to group the belfry lights in pairs.

To more intimately associate them they may be placed beneath the same gabled weathering, as at Newark, or even under the same label, arched (Grantham) or ogee (All Saints', Stamford), or square (King's Sutton), or a crocketed pinnacle may be run up between them.

As with the single lights the wall on each side may have flat panels of similar design to the belfry windows, as at Oundle, or the panelled decoration may be so completely carried over the surface that the belfry lights appear rather as interruptions in it, as Gloucester. Or, again, they may be supported by niches, as at Northleach.

Less frequently the lights are arranged in triplets, as at Ketton and Kettering.

The lights themselves may have heads of all shapes—obtuse lancet, ogee, or square-headed, as at Aldwinkle St. Peter's and Bath Abbey.

The transome frequently occurs, and occasionally the jambs and mullions are extended down below the sill to enclose a traceried panel, which may extend to the next string course. St. Cuthbert's, at Wells, is one of many instances.

The ringing stage usually has single and less conspicuous windows, although in some of the great towers and steeples they are double and of large proportions and elaborate ornament; examples of such occur at Coventry, Louth, Wrexham, and Taunton.

The lowest stage of the tower facing west contains the grand door, for use on State occasions, with the west window over it, forming, in many cases, one composition with it by having its sill on the tower hood mould, as at Northleach, or being included within the same arched recess, as at Whissendine.

Many of these west doors are very fine, as at Kettering and Middleton Cheney, and are worthy of separate study.

In the Northamptonshire district the west door is recessed with a shallow porch, which further emphasises its importance.

Such occur at Higham Ferrers, at Rushden, and at Keystone, and, with these illustrations, I will bring my paper to a conclusion."

Mr. G. H. Fellowes Prynne said he had much pleasure in proposing a hearty vote of thanks to Mr. Bidlake for his paper. Of those who really loved Gothic architecture Mr. Bidlake was one who sympathised with it intensely, and in his own work he showed that his heart and soul were in what he did, and his paper and the lantern slides showed the great amount of care and trouble he had taken in working out the gradual development of towers and spires. Papers like this were very interesting, especially to students, for they directed attention to little differences, which gradually led to greater and important differences. From the actual development from the wooden roof of the tower, which Mr. Bidlake had put before them so carefully, one saw that in all constructional work it was a natural growth and evolution from an earlier phase of work, and in this case we saw the gradual growth of the broach coming from the timber construction, and thus leading to similar forms in stone construction. He thought that the spire, of all other details of our English Gothic work, was one of the most beautiful. It had been said that it was an unnecessary adjunct—a luxury of our architecture. So it was in one sense, but it was both exquisite in form—or might be—and it was beautifully symbolic. One could think of how the Greeks would have revelled in having such a form, and how beautifully they might have treated it had they conceived it in their time. He thought that Mr. Bidlake might have mentioned such a beautiful little example as Lostwithiel, in Cornwall—a beautiful little XIVth century stone spire, pierced at the base, which Street, Butterfield, and others had greatly admired. As to wooden spires, we had lost a good many by fire, and a good many had been warped by the heat of the sun—the sun acting on the lead had heated and warped the wood, and, in some cases, had caused the wood to burn. Again, lightning had caused the destruction of some wooden spires. At Barnstaple, Chesterfield, and elsewhere the spire had gone over to one side owing to the warping of the wood. Mr. Bidlake had mentioned Ketton, which was a beautiful church, but had a somewhat heavy spire on the top of an exquisitely beautiful tower. The subject was one which made them feel proud of our national Gothic art, and it was a pleasure to see that such a fine collection of lantern slides had been brought together to illustrate this interesting subject.

Mr. Francis Bond seconded the vote of thanks. He had been very much interested to notice that, though Mr. Bidlake was one of our most accomplished draughtsmen, they had not seen a single example that evening of his own draughtsmanship. Mr. Bidlake had relied on the despised art of photography, and, as a bit of a photographer himself, it had been a pleasure to him (the speaker) to see photography made such use of. As to the paper, he agreed with almost all Mr. Bidlake had said. They had had the west front of Peterborough on the screen, and one spire was shown to be more satisfactory than the other, and the reason for that was that one spire was XIVth century work, and the other was XVth century; they look alike, but one was a colourable imitation of the other. The two spires at Litchfield had the same curious history; one was a XVth century sham pretending to be XIVth century. As to the introduction of the flying buttress, he thought the reason was, as Mr. Bidlake had pointed out, that people saw that a pinnacle was not satisfactory unless it was carried well back and placed near the foot of a spire. But, if put well back, or pretty near the spire, or, if there were two pinnacles, one outside and one inside, and there were repairs to do to the spire, the workmen could not get round the spire because of the pinnacles; but with flying buttresses the materials could be got round. Most of these features become beautiful in the hands of artistic builders, but they had some utility at the bottom of them, and that might be the case with flying buttresses in connexion with spires. As to optical corrections, one got the idea that the

Greeks were very subtle in the refinements of some of their buildings; and there were many of these subtleties. He did not intend to speak of Professor Goodyear's amazing series, and, as to our English spires, they were made in some cases to bulge a little at the centre, just in the way the Greeks treated their columns. For instance, in looking at the details of Louth spire, he was struck with the clever way the entasis had been obtained; the builders did not bulge out the eight sides, but they enlarged the crockets half way up, and then gradually diminished them in size. The people who did that were as clever as the Greeks. So it was with the windows of the late spires; they got smaller and smaller in fixed ratio as they went up. But some diminished more rapidly than they ought to do, and the result was that, because of the sharp diminution of size, the apparent height of the spire was increased. He agreed with what Mr. Bidlake had said as to the slope of the weatherings of the buttresses.

Mr. Arnold Mitchell, in supporting the vote of thanks, said that two points had struck him. One was that the system and method of study which Mr. Bidlake had evidently given to his subject was one which might be commended to all students. Mr. Bidlake had traced the development of the tower and spire from the early to the late periods, and the knowledge he had shown them in all he said was only to be acquired by travelling here and there and examining, sketching, and photographing. It was only possible to get such an accumulation of knowledge by systematic and continuous labour and study. The constant visiting of many examples had enabled Mr. Bidlake to store up in his mind the facts as to the stages by which the late work grew from the earlier, and it was this particular presentation of his facts which made the discourse so delightful to follow. The other point was as to the way in which Mr. Bidlake had traced the development of the spire from the timber construction. It seemed to him (the speaker) that there was another point of view, and that was that, judging from the study of old examples, it was not necessarily a timber construction which originally started the spire; the spire may have been begun with the endeavour of the builders to build, if possible, in a permanent material. We found that where builders had acquired the necessary skill in the use of materials and tools, they abandoned perishable materials and built in stone. That was seen in vaulted roofs; as the builders attained facility in construction, the stone construction was applied to a wider space. That was seen in Normandy, in the tower especially, and it was the roofing of a tower with stone from which (it seemed to the speaker) the stone spire was developed. The tower finished internally with an oversailing course. On the oversailing course a second oversailing course was placed, and so on, and these oversailing courses gradually formed a little, low, pyramid roof, and the spire was only a prolongation of this. Gradually the pyramid form was raised, the faces became more and more acute, and so the spire form was achieved.

The Chairman, in putting the vote of thanks to the meeting, said that the illustrations shown were so good that one could not but regret that it was not possible to publish the photographs side by side with the letterpress; the reading of such a paper without illustrations was not half as good as reading it with them. One regret he had, and he was sure they would all share it, *i.e.*, that Mr. Bidlake had omitted to show examples of his own work.

The vote of thanks having been very heartily agreed to,

Mr. Bidlake, in reply, said this was the first time he had been in the new premises of the Association, and he must say how great a satisfaction it was to him to find the Association so well housed. The preparation of the paper had given him a great deal of pleasure, and he sometimes thought that as to those who did any lecturing the benefit to the audience might be doubtful, but the benefit to the lecturer was unquestionable. Not only was the preparation of the lecture very agreeable to him, but it had obliged him to visit a good many places in order to get photographs—places he had visited years before on sketching expeditions. Sketches were out of court in a lantern illustrated lecture like the present, and it was almost impossible to get architectural lantern slides without going to the buildings themselves and photographing them. As this had to be done in the latter days of autumn, he had to be very expeditious, and frequently had a race against the failing light. He thought he could give a lecture on the sorrows of a photographer in the dark days of October and November. What Mr. Bond said about entasis of spires was very interesting. Some spires had very pronounced entasis, like the spire at Caythorpe, which was almost cigar-shaped. He would like to refer to one of the best modern examples, the Victoria Tower of the Houses of Parliament, which, he believed, was originally designed to be a third as high again. After seeing the original design for the tower he felt that the actual work was disproportionate, and it was the parsimony of Parliament which, he believed, compelled Sir Charles Barry to build the tower no higher than he did. The original design showed a most magnificent tower, and one was filled with regret that the architcet was obliged to curtail his design.

The Chairman announced that the next meeting would be held on January 19, when Mr. Lynn Jenkins would read a paper entitled "The Consideration of Sculpture by Architects."

The meeting then terminated.

THE SMOKE ABATEMENT CONFERENCE:

THURSDAY'S SITTING.

ON Thursday last week the Conference arranged by the Royal Sanitary Institute and the Smoke Abatement Society was resumed at the Hall of the Royal Horticultural Society, under the chairmanship of Sir William Preece.

The Chairman, in opening the proceedings, commented on the difference in the atmosphere of London and Berlin, and said that Berlin was a city of cleanliness, owing probably to the use of stoves and patent fuel. It had been proved that carbon particles were the cause of the density and darkness of London fogs, and the presence of carbon particles in the air was proof of the imperfect combustion of coal in their domestic as well as their factory fires. Hence, the removal of this matter from the air meant not only purification of the air, but economy of production, for it must increase the efficiency of the furnace. The proposals to establish a few large power-houses on the river in London to supplant the seventy or eighty scattered generating stations which now existed, had one great merit, as it would abate the nuisance of smoke and introduce more perfect methods of fuel combustion, and so reduce fog, for the cheapening of the cost of production of electric energy meant the adoption of every known means of economy. Internal combustion engines, where producer-gas was sucked in and exploded, was another promising field for the enthusiast. Probably the greatest sinners were the ordinary domestic grates, which were the most unscientific and inefficient heat producers in existence. The price of electric energy was falling so rapidly that the electric radiators would soon become a domestic comfort within the reach of all. In dealing with the remedies for the smoke nuisance Sir William pointed out that legislation was often obstructive, and the best method was to convince people of the economy of using smoke-prevention apparatus.

Stoking and Smoke Abatement.

Commander W. F. Camborne, in a paper on this subject, said that good stoking was the main factor in the prevention of the emission of smoke from furnaces. It was abundantly evident that the stoker of the present day should be an intelligent and well-trained man, with an education equal, or little inferior, to that possessed by an ordinary practical engineer. In this country there seemed to be no provision made for the instruction or training of men destined to become stokers for land service. The Prussian Government, in 1902, introduced a course of instruction for stokers, and in the Budget had allocated 2,000*l.* per annum for the purpose. He thought they in this country might well adopt some plan analogous to that inaugurated by the Prussian Government. He would, however, substitute municipalities and county councils for the State. If instructional courses for stokers were instituted, and if employers gave a preference to those persons who had been properly trained, the result would go far towards mitigating the terrible smoke nuisance under which they all groaned.

Abatement of Smoke in Factories.

Dr. S. Rideal submitted a paper on the "Abatement of Smoke in Factories," which, in his absence, was read by Commander Camborne. In the paper the author had drawn up a report based upon returns furnished by manufacturers who had succeeded in securing the abatement of smoke in their factories. A circular letter was issued in February by the Coal Smoke Abatement Society to sixty-three firms inviting a description of their methods. Thirty-eight firms supplied information, out of which thirty-two agreed to the publication of their methods. Three of the thirty-eight firms had substituted gas-engines for steam plant, leaving for further analysis the information supplied by the thirty-five firms. Thirteen firms mainly ascribed their success in preventing the emission of smoke to careful stoking. The following are the list of the various fuels used:—Seventeen firms burned Welsh coal only; one Welsh coal and coke; two Welsh coal and hard steam coal; one Welsh coal and bituminous nuts; one Welsh coal and anthracite; four anthracite only; one anthracite and hard steam coal; one anthracite, coke breeze, and small house coal; four hard steam coal only; one "good small coal"; one bituminous coal; and one coke. Of mechanical devices for economising fuel, eighteen firms supplied the following information of the results of their experiments:—

One British fuel economiser (economical); two Martin's patent smoke-consuming door (economical); one perforated furnace doors (fairly economical); one Richard's patent for forced draught (economical); one special mechanical device (economical); one tubular fire bars, supplying heated air to back of bridge (economical); one Edwin Coles' furnace door—Cuddy's tubular bars (not stated); one Johnson's economiser and smoke consumer (slight saving); two chain grate stoker (one, not successful with electricity generating stations, the other not running long enough to form an opinion); one induced draught (economical); one steam blower (not economical); one automatic air louvres (very economical); one Meldrum's forced draught and smoke preventer (very economical); one Meldrum's forced draught and smoke preventer (economical); one patent Venetian fire bars (effective, but extravagant of coal); one Venetian rocking furnace (saves 10 per cent. of fuel).

Two firms which had tried various mechanical devices emphatically disclaimed any benefit derived from them, and supported the evidence of other firms in favour of careful stoking. Two firms ascribed success to the height of the chimney-shaft giving an excellent draught, and one of them, in addition, to the fact that their boilers had been "set" with large flues. One firm was abandoning their mechanical devices in connexion with their boilers and steam engines, and was replacing them by electrical machinery in the hope of effecting an economy. It would be seen that the general concensus of opinion favoured skilful and careful stoking as of the first importance.

Artificial Production of Persistent Fog.

The Hon. Rollo Russell said it had been suggested that since mere combustion resulted in the projection of a very large volume of dust-laden gases into the air of London, and since vapour precipitation took place only on solid particles, many of which are microscopic or even smaller, therefore we shall be subject in London to an excess of fog whatever the fuel which may be used. It had been argued plausibly that the very fine invisible dust produced in countless millions from every gas jet would be competent, no less than the smoke particles from kitchen chimneys, to maintain the excess of London fogs. He did not know that theoretically they had the data on which to disprove this proposition. Fine invisible dust had been shown in the laboratory to be capable of producing fog by precipitation of vapour on cooling. On the other hand, they had the overwhelming evidence of experiments on a large scale against it—the evidence of the districts of anthracite coal, of towns where wood was burned, of towns where oil or oil-gas was burned, of towns where charcoal and gas were burned—that no excess of fog affected these places. In an excellent test case, that of Pittsburg, coal smoke caused much

darkness and fog cloud. Then coal was superseded by oil-gas, which freed the city from obstruction. Then, after some years, coal was largely used again, and dark fogs recurred. The chief problem for immediate practical purposes was the preservation of the cheerful open fire of sitting-rooms, including many kitchens, without the production of much smoke. Improvements in grates for a more scientific feeding of fires would lessen the nuisance considerably. The most important immediate problem requiring solution was the easy kindling of fires with little smoke, careful stoking, and economy in fuel of the right sort.

Work of a Hamburg Society.

Mr. John B. C. Kershaw described the aims and work of the Hamburg Smoke Abatement Society, which is an entirely voluntary organisation of steam users, bound together only by the common desire to obtain greater efficiency and less smoke for their steam-raising plant. Regular examinations of the plants of members, and the methods of working them, was undertaken by the expert staff of the society, and suggestions were made for improvements where such are required. The education and control of the firemen in the proper performance of their duties were also undertaken by the firemen instructors on the staff. Comparative tests of fuel and tests of smoke prevention and other appliances of a similar character were also carried out by the expert staff, and the results were circulated amongst the members of the society. From the figures given in the reports it was shown that there was a loss of 61 per cent. in efficiency of plant where untrained stokers were used. The practical lesson to be learned from the work of the society was that the smoke problem was to be solved, like many another problem, by the application of the old English method of self-help, which was now sadly out of fashion. What was wanted, however, was some society or organisation which would provide fuel users with the technical advice and oversight required for obtaining the smokeless combustion of fuel in their own works.

Reliable Observation of Smoke Densities.

Mr. Joseph W. Lovibond described the instrument which he had designed at the request of the Coal Smoke Abatement Society for measuring and recording the density of smoke as it issued from chimneys. In designing such an instrument he said that certain conditions must be complied with to make the readings reliable, viz., all observations must be made under similar conditions; the light used for comparisons must be uniform in character; in the scales of standards used for matching the divisions must be equal and the unit recoverable.

Smoke and Plant Life.

Mr. Arthur Rigg (member of the Council of the Royal Botanic Society) said that in 1880 Mr. Sowerby brought the question of the destructive effect of London smoke on plant life before the Society, and there seemed to have been no appreciable improvement or reduction in the number of fogs or their density during the twenty-five years since that complaint was written, and the evergreens, with other plants, are still crusted as thickly as ever with a black slimy product which comes down as fog. The author referred to a number of experiments which Mr. Brinsley Marlay had made, and, in conclusion, said it could be taken as a general rule that all trees or plants possessing smooth leaves can better resist the action of fogs than those which possess rough or hairy leaves, such as the foxglove, salvia, and common primrose. These and others of their class suffer the most injurious effects. So far as plants under glass are concerned, similar conditions prevail, affecting such plants as, for instance, the Chinese primula and cineraria. In all cases, however, it is necessary to keep the glass clean by washing after the occurrence of fog. Apart from the injury to human health and life, due to fogs and sunless days, the vegetable world and plant life suffers also.

Miss M. Agar gave her experience on the same subject as a landscape gardener to the Metropolitan Public Gardens Association. She endorsed the conclusions of Mr. Rigg, and said the pity of it all was that things would grow in large towns if only the air could be purified. Many country towns had famous private gardens, whereas the little gardens of the better-class London houses were generally eyesores of limp grass, smutty paths, and enfeebled privits. It was to hoped that electricity and an enlightened public conscience might remedy this by abating the smoke nuisance.

Mr. Scott Moncrieff opened the discussion, and said he felt, after all, that there was something in the scheme which he proposed twenty-five years ago for taking less gas from coal and using the residual for fuel. He suggested that municipalities owning gas works should make experiments in this direction.

Mr. Gibson (Edinburgh) believed that, with the improved appliances for stoking, firemen working under normal conditions had the matter in their own hands.

Mr. W. H. Patchell (Engineer to the Charing Cross and Strand Electric Supply Company) said that he had seen blacker smoke in Berlin than in London. He had put his company to great expense in trying induced draught, and it had turned out a failure.

Mr. J. Geldard described the great improvement which had taken place in Bradford, and thought that machine stoking presented a solution of the difficulty.

Mr. R. S. Richards thought that London compared favourably with either Edinburgh or Bradford with regard to smoke. He looked forward to electric heating as a solution of the problem.

Dr. Ormandy (Warrington) said the cause of the failure of mechanical stokers was because they were left under the control of the engineering staff, and he suggested that they should be left to the chemists.

Mr. Aitken Berry said the Smoke Abatement Society did not make the law, but, in the interests of the public, they tried to see it carried out. It would be an admirable thing to give advice, as suggested by Mr. Kershaw, but they wanted funds to carry it out.

Mr. Rhodes (Central London Railway) complained that the Society persecuted those who had the difficult task of trying to remedy the evil. His company were making experiments at great cost, but they were being closely watched all the time.

Mr. Bailie Anderson (Glasgow) thought that municipalities should recognise their duty to the community by striving to get a clear atmosphere, and employers were beginning to see that they could save expense by having electric motors instead of steam boilers, and also improve the atmosphere.

The Conference adjourned.

FRIDAY'S CONFERENCE.

Sir William Richmond presided at the concluding sitting of the Conference on Friday. In his opening remarks he said they were all aware that light gave life to colour, and that flowers lost their brilliant tints if placed in a dark cellar. Pictures became black or deep yellow if shut up in a case for any lengthened period. This had always been known to artists, and he had a letter from Rubens to a friend who he requested would have a picture which he had dispatched immediately taken out of the case and placed in the sun so that it should recover its clearness and brilliancy of colour. The Venetian painters were the great colourists of Italy, and it was related of Titian that it was his habit to place his pictures to dry in the sun, and he also allowed his pictures to remain out all night so that they might receive the benefit of the dew of the morning mists. Both these experiments he had tried in London, with disastrous effect. Some forty years ago a Royal Commission considered the desirability of transferring the whole of the national collection of pictures to South Kensington. Amongst the experts examined was Faraday, who said that every smut, however small, which remained upon the surface of a picture, even if the colour was dry, left behind it a greasy matter so potent that it could only be removed by a solvent of such a strength that, being applied, it would eat into the surface of the paint. Owing to the poison in the atmosphere of smoky cities the most noble and the most durable of all methods of painting, buon fresco, was out of the question. The failure to be permanent of the frescoes in the Houses of Parliament was mainly due to two causes. Firstly, the contact of the lime with gas and other poisons, and, secondly, to an inadequate incorporation of the pigments within the strata of lime, the angles, and surfaces of crystallisation. But in the country, given that the walls of a building were quite dry, and there was pure water to be had, and no gasworks near, there was no reason why buon fresco should not be as permanent in England as in Italy. Until, however, they rid London from the poison of smoke, fresco painting could never be practised with security. Marble was poisoned by coal smoke and rendered powdery. The same action of the grease, which he had referred to with regard to paintings, acted upon the surface of marble. The absolutely priceless Greek, Assyrian, and Egyptian works of sculpture in the British Museum were slowly but surely decaying. That exquisite surface so dear to the great craftsmen of old was fast becoming granular. Washing with water was of little use, for water would not remove the essential oil deposited by poisonous smuts. Glass would protect the surfaces in a measure if it was hermetically sealed so that poison could not enter. Precious manuscripts were liable to the same deterioration. Bronze was easier to deal with because bronze could be cleaned with a solvent, but even here they were in difficulties because the surface of bronze, upon which was dependent so much of its beauty, was eaten into by the poisonous particles. All metals, even gold, were similarly injured. Stone decayed under the same causes. Upon the lintels of windows, inside as well as outside, of St. Paul's Cathedral was deposited in places a thick layer of hardened smoke, sulphur, and what not, and this layer was in constant action. It was alive with acid which was devouring the stone and causing it to decay into powder. They had to ask themselves if all this mattered, and, putting it upon the lowest ground of commercial interests, he asked if it was wise to risk a certainty of destruction, which must come sooner or later if public opinion did not push, and, by unanimity, force Parliament to legislate firmly and surely. Pressure from the outside was the only chance for reform. In any Bill before Parliament, however, they must watch, lest it be pruned down by sophistry and weakened at every point to provide a possible loophole of exit for persistent offenders.

Systematic Analyses of Air.

Sir John Ure Primrose, Bart., read a paper on "A Plea for a Systematic Comparative Analyses of the Air of Towns, and a Consolidation of the Law Dealing with Smoke Emissions," and gave the figures which the chief sanitary inspector of Glasgow, who was responsible for the abatement of the smoke nuisance in that town, had taken. These figures, he said, illustrated what might be termed the smut fall in Glasgow in spring and winter, and what he desired was that similar experiments should be made in London and the large towns of the kingdom in order (1) that notes might be compared; (2) that the education of the public might proceed on exact and scientific lines; and (3) that some reasonable standard might finally be adopted for town air, beyond which pollution might be considered flagrant and reprehensible. At present information under this heading was in a chaotic state. With regard to the consolidation of the law dealing with smoke emissions, the most casual glance at the various Acts of Parliament under which municipal authorities were now working showed the disparity which existed between them. Speaking generally of these Acts they all, with one exception, appeared to give power to abate the smoke nuisance, and then, by the use of certain limiting expressions, permitted a loophole of escape. In Nottingham alone the law seemed to be simple and perfect, for they had no qualifications nor limitations.

Amendment of the Law.

Mr. Julian S. Corbett spoke as to the amendment of sect. 24, subsect. 6 of the Public Health (London) Act, 1891, the working of which section, he said, had always been a stumbling-block. Difficulties had constantly occurred in proving that the smoke complained of was "black," for in each case a successful prosecution depended upon what degree of density would, in the opinion of the particular magistrate, satisfy the legislative conception of "black." Municipal

inspectors were equally human, and no means exists of defining the word "black" in such a way as would be binding upon either of them, except by Act of Parliament, and it followed that the administration of the law must remain in this difficult, uncertain, and cumbrous condition until the section in question was amended. A further reason which made such an amendment highly desirable was that, apart from smoke which more or less nearly approximates to "black," great quantities of noxious smoke were emitted which cannot by any stretch of words be called "black," and which yet was as noisome and offensive as the densest. The Society suggested that the section should be amended so that it should read: "Black smoke or smoke in such a quantity as to be a nuisance."

Mr. Joseph Hurst followed with a paper on "English Law Relating to the Emission of Smoke from Chimneys." He pointed out that the emission of smoke from chimneys might be dealt with under English law in the following cases:—(1) Throughout England where that emission is a nuisance at common law; (2) throughout England (except London) where that emission offends against the provisions of the Public Health Act, 1875, or against similar provisions in local Acts; (3) in London where that emission offends against the provisions of the Public Health (London) Act, 1891. The author dealt with the Acts in detail, and quoted a number of legal decisions bearing on the matter, and, in conclusion, said that up to the present time no legislation had been attempted with the view of minimising smoke from domestic kitcheners or grates. The height of buildings, etc., affecting the access of light and air had been the subject of drastic enactments; but the domestic kitchener or grate, which, by the smoke it sends forth, enormously affected light and air, had, so far as legislation was concerned, been left to work "its own sweet will." This seemed inconsistent with the principle which one would assume underlies legislation, under which domestic appliances in connexion with water, gas, electric current, etc., had been the subject of jealous regard, and were the objects of frequent domiciliary visits even in the neighbourhood of the domestic hearth. It was to be hoped that, as a result of the inquiries now being carried on by the Coal Smoke Abatement Society, with the assistance of the Office of Works and others, a domestic grate might be discovered which shall, by improved combustion, prevent, at least, black smoke. When such a grate was discovered, legislation would be not only desirable, but opportune, by which there may be secured to the consumer more beneficial use of fuel, and to the metropolis and to large provincial cities and towns brighter and cleaner atmospheres.

Local Authorities and Smoke Abatement.

Mr. L. W. Chubb (Secretary of the Coal Smoke Abatement Society) gave details of the replies which had been received from 205 local authorities to a series of questions addressed to them as to what extent they had grappled with the problem of smoke abatement. Of the 205 reports those received from county councils did not call for comment, as such councils did not possess urban sanitary powers. Thirty other authorities confessed to having entirely neglected the matter; twenty-two authorities have special smoke inspectors; twenty authorities utilised the services of the police; forty-eight authorities had time limits for the emission of smoke; twenty-five replies showed that an increase of the nuisance had taken place; eighty said it showed a tendency to decrease; and forty said it remained stationary. In twenty-three metropolitan borough councils 4,353 reports of smoke nuisances were dealt with during the past two years. To sum up, the returns disclosed that, while the black smoke evil is very generally felt and deplored, relatively few local authorities have in the past taken a decided stand in the matter, and that, while this inactivity may sometimes be traced to apathy, it is more often due, not to any inclination to evade responsibility, but to a feeling of hopelessness in view of the uncertainty of obtaining convictions. Where authorities have taken a decided stand, however, even with the imperfect machinery at present available for the suppression of smoke nuisances, it is only fair to say that they claim to have diminished the evil. Little improvement or zeal can be looked for until the law is simplified and extended, and a more summary and effective method of procedure provided. It is, perhaps, not too much to hope that the Local Government Board, in view of the suggestions made by important corporations, may see its way to clothe local authorities in the immediate future with the further powers for which they ask.

Views of Inspectors.

Mr. T. G. Dee (Sanitary Inspector of the City of Westminster) described the duties cast upon sanitary inspectors under the Public Health (London) Act, and said that if too much smoke was even now sent forth from chimneys the inspector was not to blame. He advocated bringing pressure to bear on the legislature to give fuller powers against the evil.

Mr. W. Nicholson (Smoke Inspector of Sheffield) was unable to be present to read his paper on "Smoke Nuisance Inspectors and their Difficulties." The author commented on the apathy displayed by local authorities in regard to putting the law in force, and thought the Government might compel such authorities to take action. The Government ought to divide the country into divisions, and subdivide it into districts, and appoint divisional and district smoke inspectors who would proceed against nuisances, irrespective of by whom created, without fear or favour. If such a suggested departure was too drastic, then the Local Government Board ought to make the position of the smoke inspector secure under the local authority as long as he did his duty. If security of tenure was given to smoke inspectors it would be a salutary step in the right direction.

A discussion followed the reading of the papers, and Sir J. Ure Primrose proposed the following resolution:—"That it is desirable to consolidate the various societies and bodies throughout the United Kingdom having for their object the diminution of smoke, and that the Coal Smoke Abatement Society are requested to take steps to attain that end."

Mr. Corbett seconded the resolution, and it was agreed to.

Votes of thanks were accorded to the different bodies who had given the members facilities for visiting their works, and the Conference ended.

Fifty Years Ago.

FROM THE *Builder* OF DECEMBER 22, 1855.

THE TRADE UNIONS, we much fear, have done great mischief, and, conducted as they now are, will do more. Hundreds of thousands of pounds have been injuriously squandered, trade has been diverted to other countries, and the advance of the working classes has been retarded. They would even prevent men from working as long as they please. Take, for example, the following notice lately received, according to a local journal, by a mason in Leicester, because, being employed upon work where he had the advantage of light during only a few hours in the day, he committed the very heinous offence of filling up his time by working in his employers' yard at other times:—This his to inform you that if you, Insisting on going to Work Gaslight after you have been working out all day, you will be consider no longer a member of the Mason Society, but buide by the consequenc.—We remain yours, In the Bond of Uneon, the Masons of Leicester."

Illustrations.

DECORATIVE PICTURE: "THE NATIVITY."

THIS illustration of The Nativity is from a cartoon by Mr. N. H. J. Westlake, to whom our readers have once or twice before been indebted for an illustration bearing on the Christmas season. The actual painting was executed as part of the reredos in the Church of the Annunciation, Chislehurst.

ALL HALLOWS CHURCH, LOMBARD-STREET.

THESE illustrations, which form part of the complete survey of the church by students of the Royal College of Art, are from one-eighth scale survey drawings made on the spot by Mr. W. S. George and Mr. G. R. Woolway. They serve to put on record the architectural features of a London church of much interest, the existence of which is not altogether safe, proposals for its demolition having already been made.

The history of All Hallows, Grasschurch, begins from pre-Conquest times, and, as early as 1053, the church was given by Brightmer, citizen, to Canterbury, of which it forms one of the thirteen peculiars in London. The main fabric, as rebuilt by John Warner, sheriff, and his son, Robert, in 1494-1516, was destroyed by the Great Fire; but the tower, completed in 1544, was standing, albeit in a dangerous state, in 1679. As rebuilt by Wren, and completed in 1694, at a cost of 8,058*l.* 15s. 6d., All Hallows was the last of the City parish churches finished by him. The exterior, which can scarcely be seen from the street, evokes no especial comment; the tower, 21 ft. 6 in. at base, rises in three stages to about 100 ft., and is finished with a plain cornice and a high parapet, whereof the upper course has an arcade of well-designed plate-tracery work. On the south side of the tower is the porch, with Corinthian columns, a cornice, and a small square block, with pediment above. The body of the church is almost a model, in practical qualities, of a church for congregational worship. It is not a regular parallelogram on plan; it measures about 84 ft. by 52 ft., and is 30 ft. high. The ceiling is coved against the walls with groined openings over the round-headed side windows, which alone, until the opening in 1880 of the panel in the ceiling, lighted the church. The interior, however, is remarkable for the variety and beauty of its enrichment in the shape of wood-carving and other embellishments. A considerable portion of the carved work, including the pulpit (similar to that in St. Mary, Abchurch), sounding-board, and the lower portion of the oaken reredos, is attributed to Grinling Gibbons, and presents all the characteristics of his school. The beautiful white marble font and its cover, of which we give an illustration, are relics from St. Bene't, Gracechurch-street. Some other notable features are the altar, the oaken wainscot of the walls, the sword-irons near the pulpit, the handsome trophy of the Royal Arms in the "void," the glass (by A. Gibbs) in the ten windows, and the two door-cases, or lobbies, since used as cupboards, against the screen, in each of which a curtain is most cunningly carved. The church was repaired and beautified in 1847 and redecorated in 1880; at a restoration, carried out in 1870, under the superintendence of Messrs. Francis, the organ—by Harris, 1695—was rebuilt by Gray & Davison. In our number of April 15 last we published Mr. William Wildman's drawings of the front of the organ-case, and Mr. Walter S. George's drawing of one of the two door-cases mentioned above. The drawings appertain to a complete set of one-eighth scale drawings, which, together with working details of many of the wood and iron work fittings, were made by students of the Royal College of Art two years ago when the benefice was vacant, and proposals had been made, for the second time, to demolish the church and unite the benefice to that of the adjacent church of St. Edmund the King and Martyr. Petitions against the demolition were made by the British Archæological Association, and by many gentlemen eminent in art, science, and literature; the proposal was rejected by sixty-four votes to ten at a combined vestry meeting of the parishioners on November 12, 1903. The gateway was removed, with its door, from the Lombard-street entrance into the vestibule in the tower in 1865, at the time of the rebuilding of the adjoining premises; it is elaborately carved in wood with *memento mori* emblems, one of which, a coffin-lid, bears a date "1699." A chained Bible (1613), and Erasmus's "Paraphrase" in two folio volumes, printed by Edward Whitchurch, at the Sun, in Fleet-street (1548), are relics from the Great Fire which destroyed St. Bene't's Church, Gracechurch-street. In the pulpit

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THE NATIVITY.—From a Cartoon by Mr. N. H. J. Westlake.

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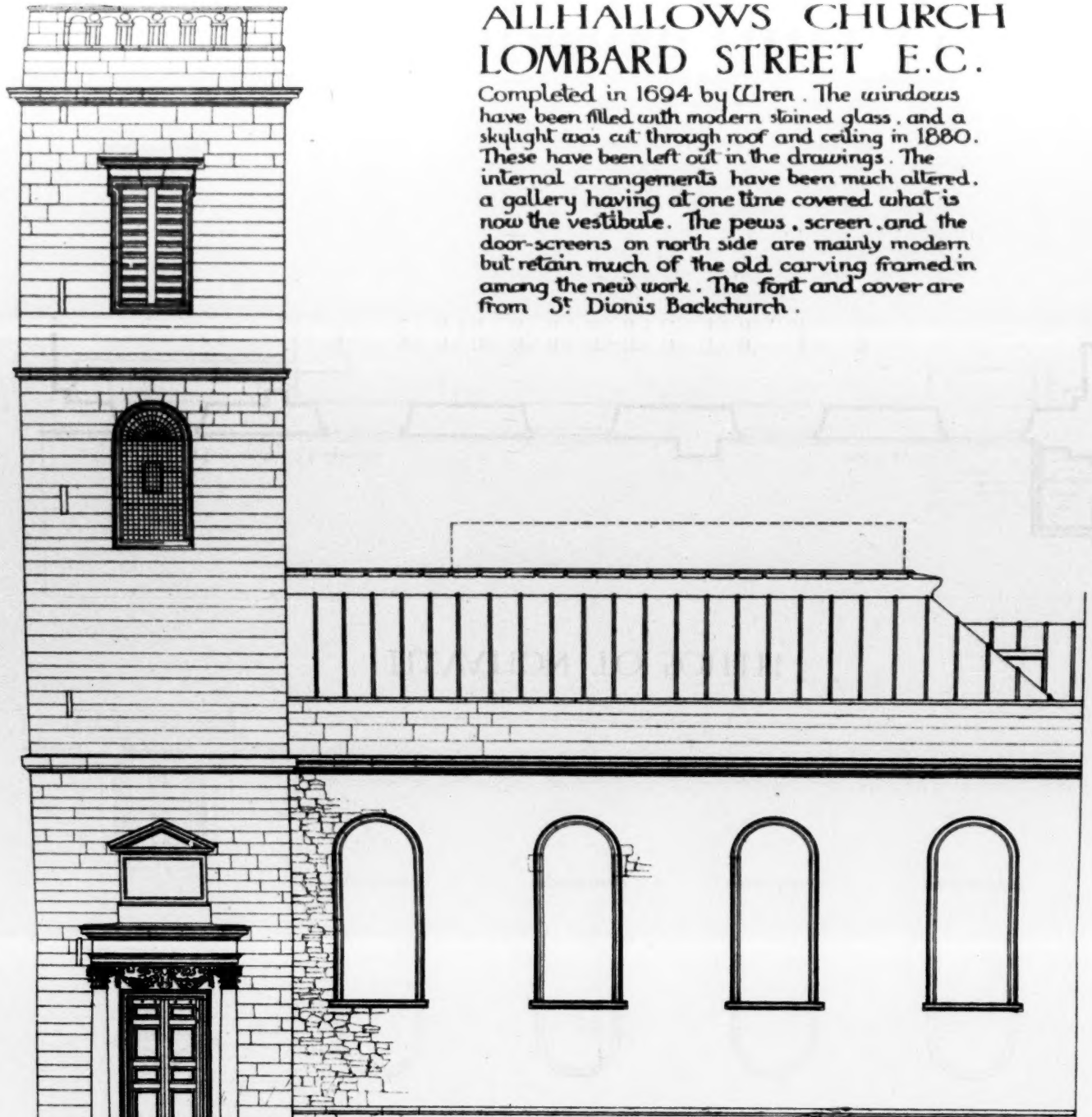
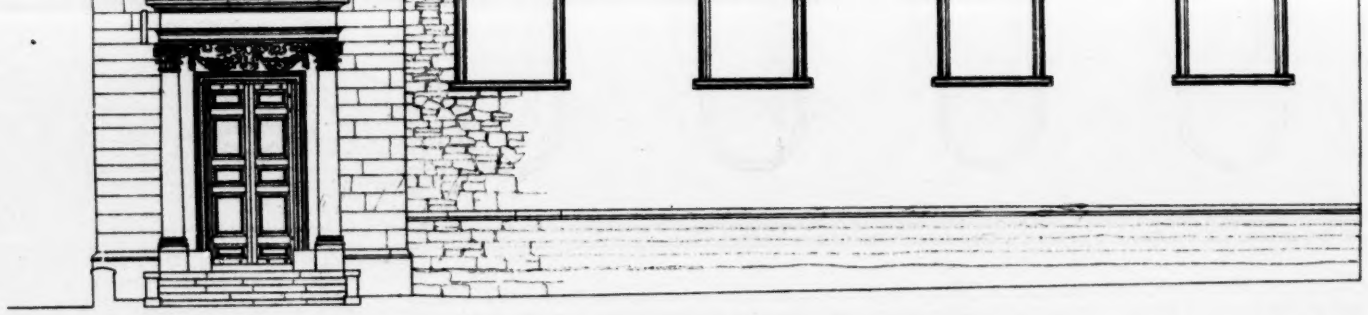
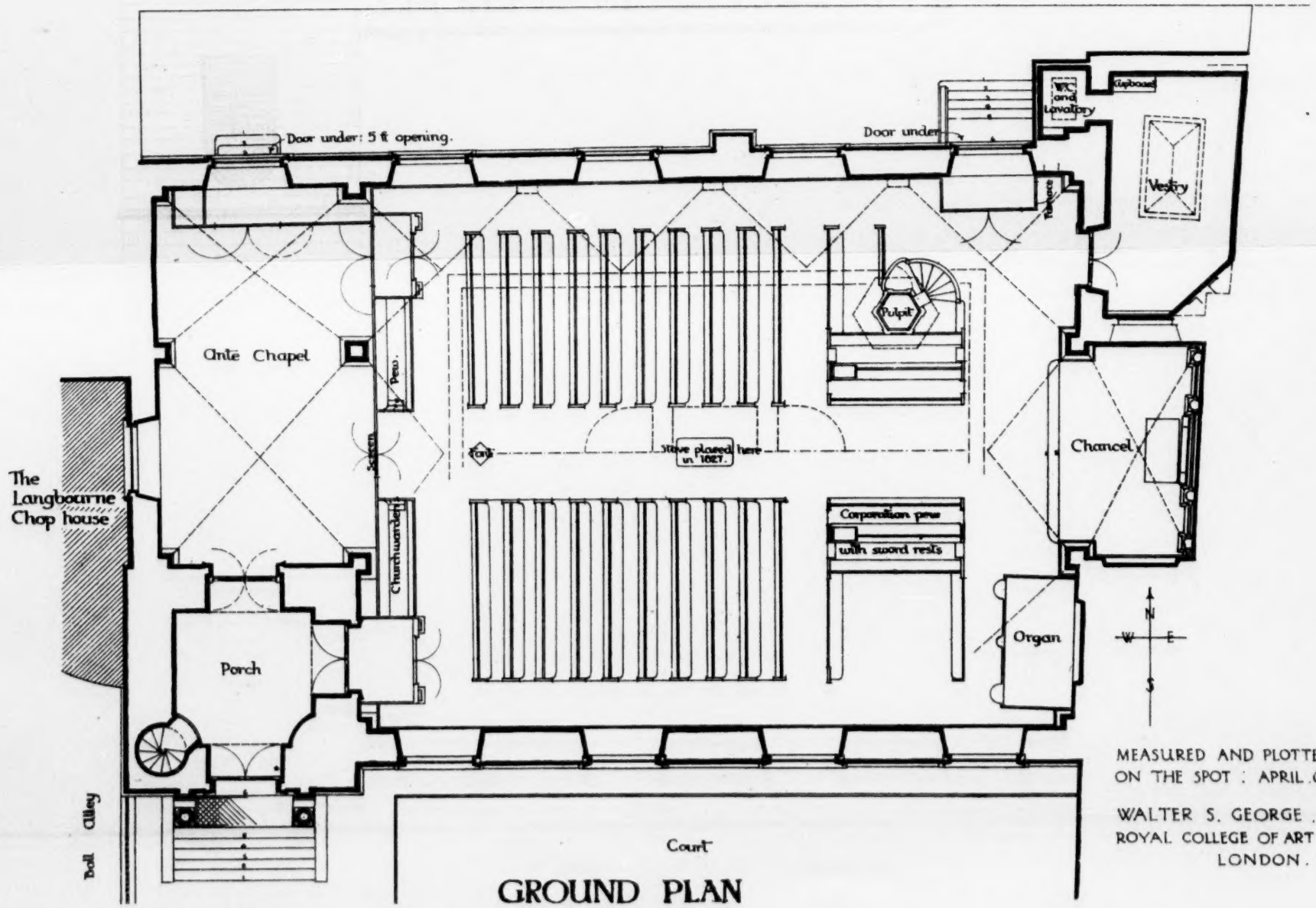


ALLHALLOWS CHURCH
LOMBARD STREET E.C.

Completed in 1694 by Wren. The windows have been filled with modern stained glass, and a skylight was cut through roof and ceiling in 1880. These have been left out in the drawings. The internal arrangements have been much altered, a gallery having at one time covered what is now the vestibule. The pews, screen, and the door-screens on north side are mainly modern but retain much of the old carving framed in among the new work. The font and cover are from St Dionis Backchurch.



ELEVATION TO SOUTH

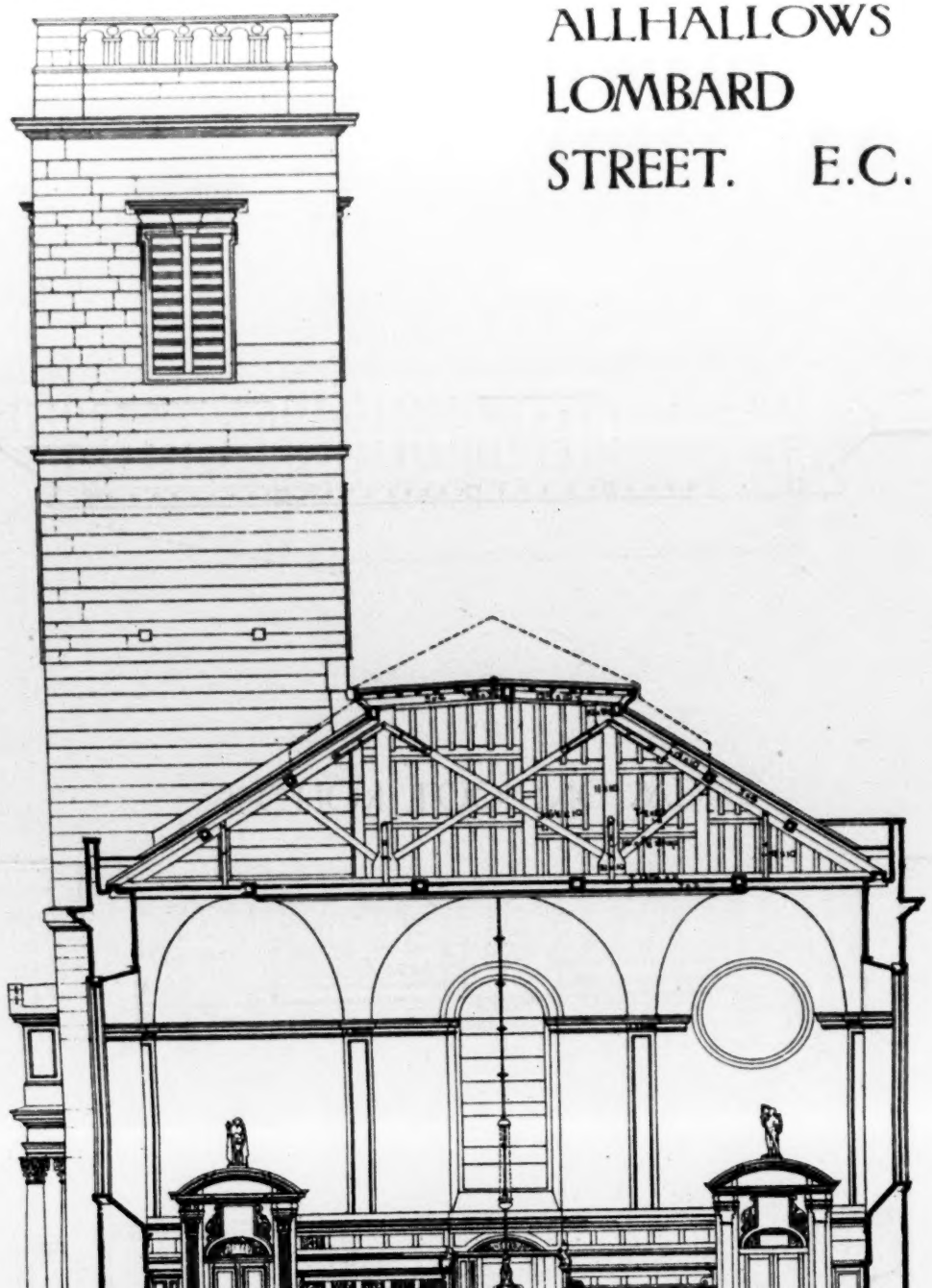


GROUND PLAN

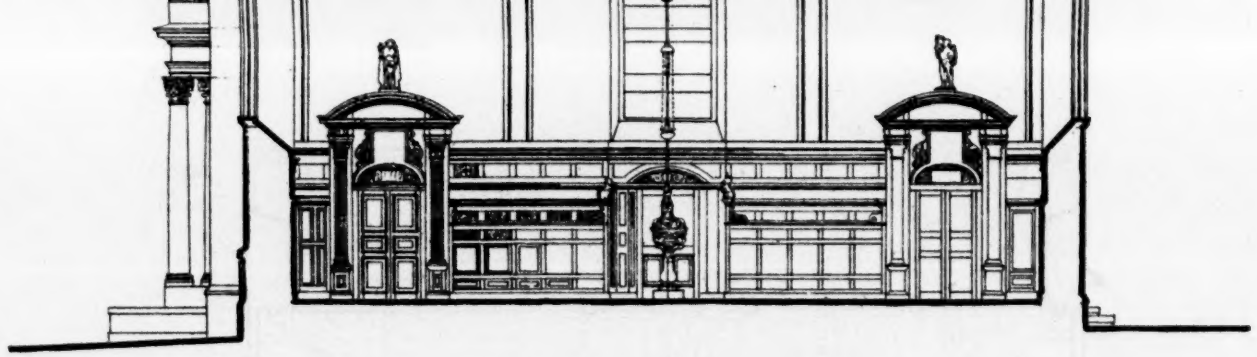
MEASURED AND PLOTTED ON THE SPOT : APRIL .03

WALTER S. GEORGE .
ROYAL COLLEGE OF ART
LONDON . S.W

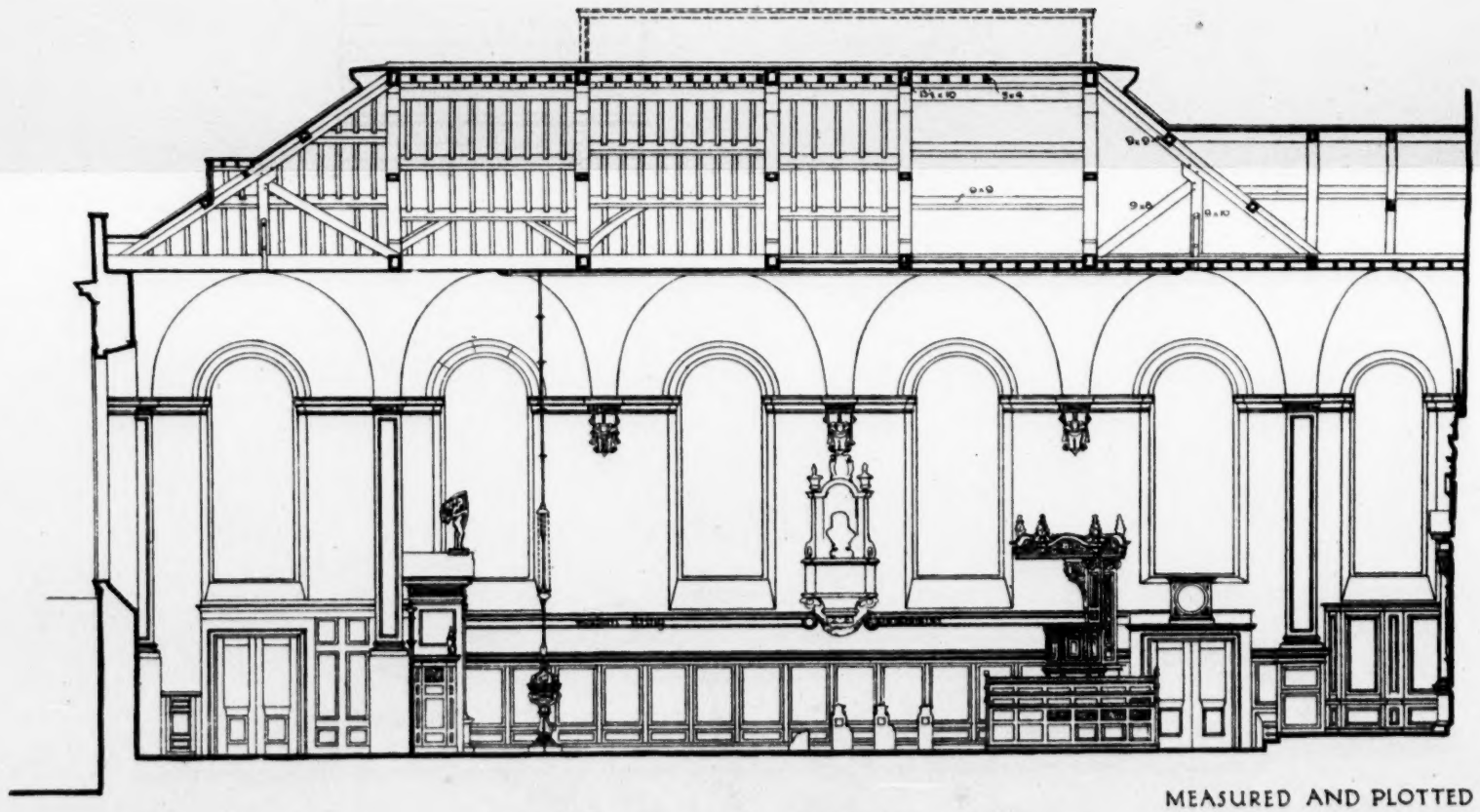
PHOTO-LITHO. SPRAGUE & Co LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.



ALLHALLOWS
LOMBARD
STREET. E.C.



SECTION LOOKING WEST.

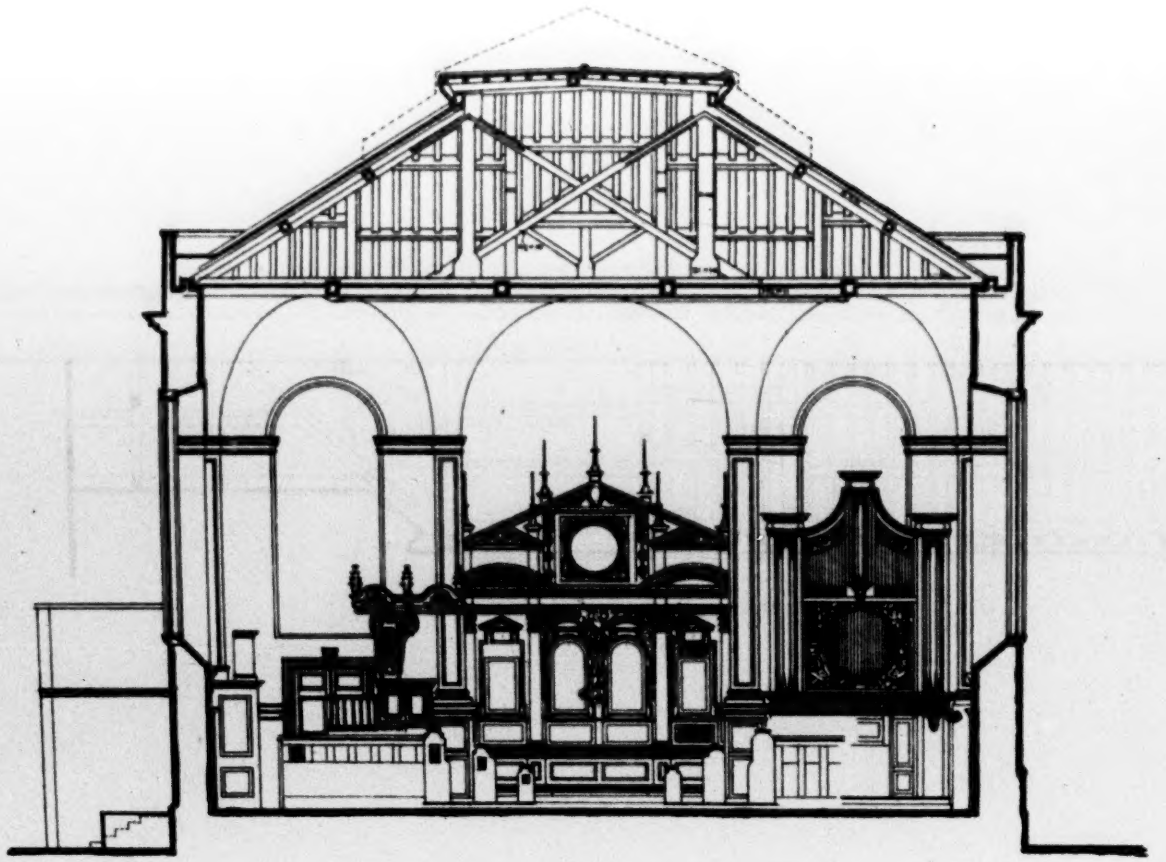


SECTION LOOKING NORTH

MEASURED AND PLOTTED
ON THE SPOT : APRIL 1903.
WALTER. S. GEORGE
ROYAL COLLEGE OF ART. S.W.

Scale of 10 0 10 20 30 40 50 60 70 80 feet

PHOTO-LITHO. SPRAGUE & Co LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

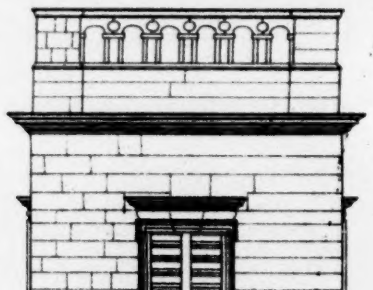


ALLHALLOWS CHURCH LOMBARD St

SECTION LOOKING EAST

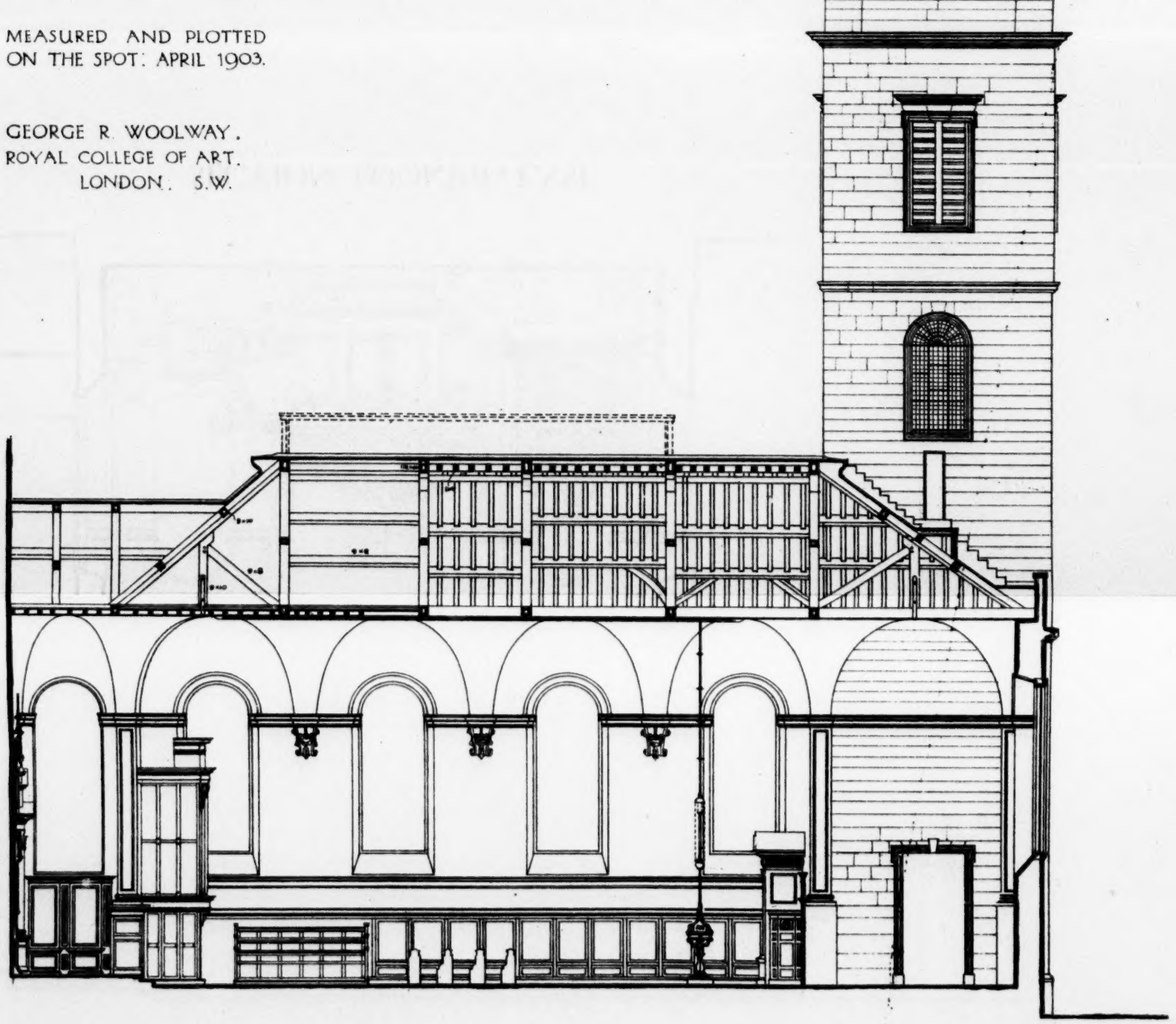
MEASURED AND PLOTTED
ON THE SPOT: APRIL 1903.

GEORGE R. WOOLWAY.
ROYAL COLLEGE OF ART.



MEASURED AND PLOTTED
ON THE SPOT: APRIL 1903.

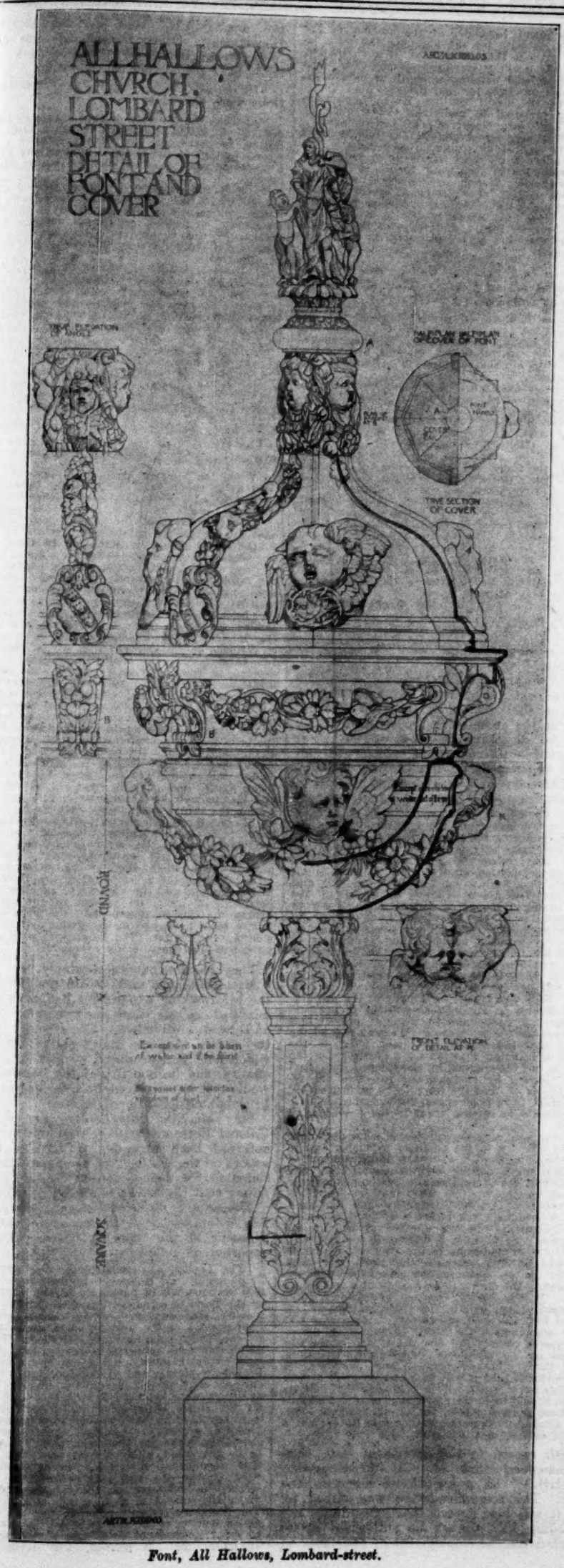
GEORGE R. WOOLWAY.
ROYAL COLLEGE OF ART.
LONDON. S.W.



SECTION LOOKING SOUTH

Scale of Feet

PHOTO LITHO. SPRAGUE & Co LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.



Font, All Hallows, Lombard-street.

Wesley preached his first extemporary sermon; and during 300 years, until 1891, sixty Blue Coat boys went to the church, on the morning of Good Friday, to receive apiece a new penny and a bag of raisins in terms of the will, dated April 24, 1586, of Peter Symondes, citizen and mercer. All Hallows now forms the mother church of St. Bene't, St. Dionis Backchurch, and St. Leonard, Eastcheap (or Milkchurch).

THE LONDON TOPOGRAPHICAL SOCIETY.

THE annual meeting of the London Topographical Society, which was held at the rooms of the Society of Antiquaries on Friday the 15th inst., was very well attended. From the annual Report it appears that the number of subscribers is now 201, an increase of thirty-six since the last meeting. Fifty of the subscriptions are from public libraries and institutions, of which ten are American and one Colonial. The last publication of the Society consisted of reproductions of the maps of Ralph Agas and of Faithorne and Newcourt, copies of which were hung on the wall. Some remarks on these maps may be of interest.

Of the map engraved by William Faithorne, the Bibliothèque Nationale at Paris possesses a lettered copy; another, without title, and lately acquired for the British Museum, is, we gather, identical with that which was deposited for a while with Messrs. Stanford seven years ago by Mr. C. L. Lindsay. The survey, "composed by a scale [12 in. to a mile], and ichnographically described by Richard Newcourte, of Somerton, in the countie of Somersett, gentleman," is dated 1658—one may doubt that it was ever published—yet it appears from internal evidence that the actual plotting had been begun a few years previously. For whilst it delineates Charing Cross, which, as Lilly records in his "Observations on the Life of King Charles," 1715, was pulled down in July-August, 1647, it does not depict the other Queen Eleanor Cross which stood in Cheapside, opposite Wood-street, until its demolition on May 2, 1643: confer Evelyn's diary *passim*.* The *Illustrated London News* of December 8, 1855, announced the discovery in London of an impression of the Newcourt, being, we learn, that which was copied on five sheets, 75 in. by 39 in., by George Jarman, and published on May 1, 1857, by A. E. Evans & Sons, of No. 403, Strand, who had supplied the running title by means of a tracing of the impression in Paris. In May, 1878, Mr. Edward Stanford republished the facsimile printed from the five copper plates engraved by Jarman, which are still preserved. The total inhabited area as plotted amounts to no more than four and a half square miles, having Bunhill-fields and Clerkenwell to the north, and St. Giles-in-the-Fields village, St. James's Park, and Tart Hall and "Barksheire" (now the site of Bridgewater) House to the west; the south is bounded by Westminster, Lambeth, and a group of houses around St. George's Church, Southwark; northwards all is open country beyond Clerkenwell and Bunhill-fields, and on the east are only a few houses outside a line drawn from Whitechapel Church to the Tower, with the highways to Shoreditch, Wapping, and Limehouse. At the north, east, and south limits windmills are placed. The shipping below bridge is finely executed.

The map which is commonly attributed to Ralph Agas, who practised as a land surveyor chiefly in Suffolk during forty years, was first drawn, we may presume, at some time within the interval 1561-1576, inasmuch as St. Paul's is drawn without the spire that was destroyed by lightning in 1561, and The Theatre, which Burbage built in the liberty of Halliwell, Shoreditch, in 1576, is not plotted. There is an original impression in the Pepysian Library at Magdalene College, Cambridge. The copy belonging to the Corporation of the City of London was printed from wooden blocks, 6 ft. ½ in. by 2 ft. 4½ in., but without either date or scale, *temp.* James I., whose coat-arms it bears at the top, though Queen Elizabeth's royal coat-arms are carried

* Some new buildings up to about 1658 are shown; for example, the west side, Arch-row, of Lincoln's Inn-fields, and "New Market" (Clare Market), opened in 1656. In the lettering the names of the churches have not "St." prefixed.

by the State barge. Agas's map has been often reproduced; in 1874 W. H. Overall, F.S.A., librarian to the Corporation, brought out an exact facsimile of the Guildhall exemplar, executed by F. J. Francis. In 1737 George Vertue concocted for the Society of Antiquaries a so-called "reproduction"; he inserted a date "1560" in Roman characters, and made sundry alterations and omissions, using some pewter plates, now conjectured to be spurious. The views of Oxford (1578) and Cambridge (1592) in the Bodleian Library are accredited to Agas, who died in his native town, Stoke-by-Nayland, Suffolk, on November 26, 1621, aged eighty or more years. Two letters written by him to Lord Burghley are preserved in the Lansdowne and Additional MSS., British Museum; one describes his labours in the fen lands, another, dated February 22, 1592-3, relates to land measuring and "platting," and cites the use of the "profitable staffe," a theodolite of some 20 in. in diameter, with a protractor of at least 1 ft.

Mr. Philip Norman, Vice-President, who occupied the chair, showed an exceedingly interesting set of slides illustrating all the hitherto discovered portions of the Roman wall of London, giving in the first instance a plan showing the assumed or (in regard to most parts) the known course of the wall. The photographs brought out admirably the characteristic features of the Roman masonry. It would be of little use, however, to attempt to follow Mr. Norman's remarks in detail without the illustrations on which he commented.

THE LONDON COUNTY COUNCIL.

THE last meeting of the London County Council before the Christmas recess was held on Tuesday in the County Hall, Spring Gardens, Sir E. A. Cornwall, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee, it was agreed to lend Camberwell Borough Council 1,815*l.* for housing purposes; Fulham Borough Council 25,000*l.* for electric lighting purposes; Greenwich Borough Council 2,750*l.* for extension of cemetery; Hammersmith Borough Council 1,848*l.* for street improvement and extension of river wall; St. Pancras Borough Council 21,772*l.* for purchase of property under Part II. of the Housing of the Working Classes Act, 1890; and Wandsworth Borough Council 1,530*l.* for street improvement. Sanction was also given to Stoke Newington Borough Council to borrow 18,020*l.* and 5,800*l.* for provision of dust destructor.

Quantity Surveyors.—The General Purposes Committee recommended, and it was agreed:—

"That the seal of the Council be affixed to duplicates of the agreements entered into with the undermentioned quantity surveyors—Messrs. Arding, Bond, & Buzzard, Messrs. Nothcroft, Neighbour, & Nicholson, Mr. C. W. Brooks, Mr. F. Donning, Mr. H. H. Robinson, Messrs. W. H. & P. B. Strudwick, and Messrs. Young & Brown.

That the seal of the Council be affixed to the supplemental agreement (in duplicate) with Messrs. J. Rider Hunt & Co., of No. 181, Queen Victoria-street, quantity surveyors."

Lack of Employment.—They also recommended:—

"That is be an instruction to the various committees of the Council that the undermentioned conditions shall hold good with regard to any work which it may be found possible to offer the Central (Unemployed) Body for London as suitable for the classes of the unemployed qualified for assistance under the Unemployed Workmen Act, 1905—(1) That the Central Body shall be the employers and responsible for the conditions of the employment as between themselves and the persons employed; (2) that the works executed by the Central Body shall be subject to supervision by the proper officers of the Council; and (3) that the amount of co-operation in cost on their part shall be such as is certified by the Council's officers to be the fair value of such work, be approved."

The recommendations were agreed to.

Hammersmith Technical Institute.—The following recommendations were made by the Education Committee and agreed to:—

"That expenditure on capital account not exceeding 25,500*l.*, for constructional work only, in respect of the erection of section "A" (art block) of the London County Council Hammersmith Technical Institute, be sanctioned.

That section "A" (art block) of the London County Council Hammersmith Technical Institute be erected, and that the working drawings, specifications, and bills of quantities therefor, submitted to the Education Committee on November 1, 1905, be approved.

That, in the event of the Works Committee agreeing to undertake the erection of section "A" (art block) of the London County Council Hammersmith Technical Institute, at the amount of the architect's estimate for the building, the work be executed without the intervention of a contractor, and that the working drawings, specifications, bills of quantities, and building estimate be referred to the Works Committee for that purpose.

That, in the event of the Works Committee not being prepared to undertake the erection of section "A" (art block) of the London County Council Hammersmith Technical Institute, tenders therefor be invited by public advertisement.

That tenders be obtained from selected firms, who make a speciality of such work, for the installation of a ventilation system in connexion with the erection of section "A" (art block) of the London County Council Hammersmith Technical Institute; and that the firm whose tender is accepted be required to enter into a contract with the Council to execute the work as sub-contractor to the building contractor."

Holborn Day Training College and Central School of Arts and Crafts.—They also recommended as follows:—

"That expenditure on capital account not exceeding 111,610*l.* in respect of the erection of (i.) the London County Council Day Training College, and (ii.) the Central School of Arts and Crafts, on the site in Southampton-row (Holborn), be sanctioned.

That the working drawings, specifications, and bills of quantities submitted to the Education Committee for the erection of (i.) the London County Council Day Training College, and (ii.) the Central School of Arts and Crafts, on the site in Southampton-row (Holborn), be approved.

That, in the event of the Works Committee agreeing to undertake the erection of (i.) the London County Council Day Training College, and (ii.) the Central School of Arts and Crafts, on the site in Southampton-row (Holborn), at the amount of the architect's estimate for the buildings, and subject to the Board of Education approving the working drawings of the Central School of Arts and Crafts, the work be executed without the intervention of a contractor; and that the working drawings, specifications, bills of quantities, and building estimate be referred to the Works Committee for that purpose.

That, in the event of the Works Committee not being prepared to undertake the work, tenders therefor be invited by public advertisement."

The recommendations were carried after discussion.

The Building Acts Amendment Act.—The Establishment Committee brought up a report on the question of the staff arrangements in the Architects' Department which would be necessary in view of the great amount of additional work which will fall on the department on the London Building Acts (Amendment) Act becoming operative. They reported:—

"The Council is required to deal with cases within one month from the deposit of plans (or two months during the summer recess), and a period of fourteen days only is allowed within which the Council may refuse to issue a certificate after notice of completion of the work required. All cases will thus have to be dealt with promptly and effectively. The Act also allows an appeal by the owner to the Tribunal of Appeal with respect to any requirement by the Council or refusal to sanction exemption from the provisions of the Act, and the preparation of plans and particulars to support the Council's case before the Tribunal of Appeal will become necessary. About 10,000 buildings will have to be dealt with, and the duties which will devolve on the department will be very heavy. They will consist principally of the preparation of reports on applications and the preparation of plans and particulars in cases of prosecutions to support the Council's cases. We may remind the Council that the details for giving effect to the method of bringing into force the provisions of the Act were not those urged by the Council, but, Parliament having by modifications increased the responsibilities of, and the work to be performed by, the Council, there is no option but to make adequate arrangements for giving effect to the provisions of the Act.

We have very carefully considered what assistance must be afforded to the architect to enable him to successfully cope with the very large amount of additional work falling on his department, and the Building Act Committee have also communicated with us on the matter. The work embraced in the Amendment Act is entirely new, and includes a series of buildings not hitherto within the control of the Council. In the absence of definite experience of this work it is difficult to forecast with precision what additions to the staff will be necessary. In the first instance the work will most probably be of a fluctuating character, and the additions to the staff will be mainly of a temporary nature. It is necessary, however, to provide a working organisation, and in the circumstances we are advised that the most satisfactory arrangement will be to amalgamate the work of providing means of escape in case of fire now dealt with in the two sections of the architects' department. The work would thereby be concentrated, and, moreover, we are convinced that it will be better on every ground that this work, which will be of a somewhat delicate nature, should be in the hands of experienced officials who have for years been trained in business somewhat similar in character rather than to appoint a staff of entirely new officials."

With regard to the permanent staff, they recommended that Mr. J. C. Stransom, A.R.I.B.A., be promoted to supervise the work. The recommendation was agreed to, and it was also agreed that expenditure not exceeding 50*l.* a week be authorised up to March 3 for the employment of assistants on the unestablished staff in the Architects' Department. Other recommendations as to increases of salary of other officers were taken back for further consideration.

Tramways.—The following recommendations were agreed to:—

"(*a*) That the estimate of expenditure on capital account of 186,000*l.*, submitted by the Finance Committee, to cover the cost of the erection of the second portion of the Greenwich electricity generating-station and the Greenwich sub-station, be approved.

(*b*) That the estimate of expenditure on capital account of 250,500*l.*, submitted by the Finance Committee, in respect of the provision of the plant, machinery, and other equipment for the second portion of the Greenwich electricity generating-station and the sub-station in connexion therewith, be approved.

(*c*) That the capital estimates of 2,000*l.*, 15,000*l.*, 18,500*l.*, 1,500*l.*, and 30,000*l.*, approved by the Council, in respect of preliminary works and expenditure in connexion with the erection and equipment of the second portion of the Greenwich electricity generating-station and the Greenwich sub-station, be cancelled.

(*d*) That the Highways Committee be authorised to take any necessary preliminary steps, including the invitation of tenders for the execution of the several works necessary for the erection and equipment of the second portion of the Greenwich electricity generating-station and sub-station."

Norbury Estate: Brickmaking Operations.—The Housing of the Working Classes Committee reported as follows:—

"When the Norbury estate was acquired by the Council for the purpose of providing working-class dwellings under Part III. of the Housing of the Working Classes Act, 1890, one of the conditions of purchase was that the plant which had been used by the vendor in the manufacture of bricks on the estate should be purchased by the Council. One section of the estate comprises a rising ground of clay, which has to be removed or levelled before the estate can be properly developed. Soon after acquiring the estate, therefore, the Council had to consider whether it would be better to dispose of the brick-making plant and bear the expense of carting away the clay or to convert part of the clay into bricks which could be used in the erection of cottages on the estate. After giving the matter full consideration the Council, on May 21, 1905, decided to adopt the latter course, and arrangements have since been made for the work to be carried on through the direct employment of labour.

The bricks already made are being used for the cottages which are in course of erection on Section A of the estate, and we consider it most desirable that the brick-making operations should be continued for the present. During the past season 2,328,000 bricks were made on the estate at an estimated cost of 3,035*l.*, the expenditure sanctioned by the Council being 4,000*l.*, and, judging from the appearance of the clamps and an examination of those already sorted, the output must, in our opinion, be regarded as in every way satisfactory. The brick-making plant is in good working order, and the cost of production would be seriously affected if the machinery were laid up at this stage. The bricks already made fall far short of the number that will be required for the development of the whole estate, and we would ask the Council to sanction the expenditure of 1,000*l.* on account of the operations during the current season until the Finance Committee shall have had an opportunity of fully considering the matter. The Finance Committee have agreed to this course being adopted. . . ."

They recommended accordingly.

Mr. Phillimore said he did not think that the brickmaking experiment had been an unqualified success, and he was sorry that it had been undertaken. He recently visited the estate, and saw that some of the bricks which had been produced were of an inferior quality, and he hoped that the housing work would not be sacrificed in order to make the brickmaking experiment succeed.

Sir Melville Beachcroft moved, and Colonel Rotton seconded, that the matter be referred back in order to have a further report on the matter, but the amendment was defeated, it being denied by some councillors that the bricks produced were inferior.

Housing: Aylesbury-place, Clerkenwell, and Union-buildings, Holborn, Scheme.—The Housing of the Working Classes Committee reported as follows:—

"The London (Aylesbury-place, Clerkenwell, and Union-buildings, Holborn) Improvement Scheme, 1899, as modified in pursuance of the Order issued by the Local Government Board on October 14, 1905, provides that dwellings for the accommodation of 1,250 persons of the working class shall be erected on the Union-buildings area, Holborn. The area, which comprises property in Leather-lane, Portpool-lane, Verulam-street, Baldwin's-place, Dove-court, Providence-place, and Union-buildings is being cleared, and preliminary plans of the proposed dwellings were approved by the Secretary of State for the Home Department on June 16, 1904. The working drawings have now been completed, and it becomes necessary therefore that arrangements should be made for the erection of the dwellings to be proceeded with. It was originally intended that accommodation for 1,480 persons should be provided on the site, and an endeavour was made to secure the extension of the rehousing obligation under the scheme so as to enable this to be done. The necessary consent, however, was not obtained, and a portion of the site on which it was proposed to erect a block of dwellings, containing accommodation for 230 persons, will remain to be

disposed of as the Council may think fit. The remaining block of dwellings will contain accommodation for the number required to fulfil the Council's obligation under the scheme as well as fifteen shops. The total cost of erecting the buildings, including that of lithography, articles to be bought direct, professional charges, and incidental expenses, is estimated at 80,050*l.*, and we have accordingly forwarded to the Finance Committee an estimate of that amount. The value of the site for housing purposes is estimated by the valuer at 14,550*l.* . . . ."

They recommended

"(*a*) That the estimate of expenditure on capital account, of 80,050*l.*, submitted by the Finance Committee, be approved in respect of the erection of working-class dwellings on the Union-buildings area, Holborn, together with the cost of lithography, bills of quantities, articles to be bought direct, professional charges, and incidental expenses.

(*b*) That expenditure not exceeding 80,050*l.* be sanctioned in respect of the erection of working-class dwellings, inclusive of all incidental work, on the Union-buildings area, Holborn, and that the housing value of the site be fixed at 14,550*l.*

(*c*) That, in the event of the Works Committee being satisfied with the sufficiency of the estimate for building work, the erection of the dwellings be undertaken by the Council without the intervention of a contractor, and that the working drawings, specifications, bills of quantities, and estimate for building work be referred to the Works Committee for that purpose; but that, if the Works Committee be not prepared to undertake the work at the amount of the estimate, tenders be invited from a number of selected firms for the execution of the work."

The recommendations were agreed to after the defeat of an amendment.

White Hart-lane Estate: Erection of Cottages on the Tower-gardens Section.—The same Committee reported as follows, the recommendations being agreed to :—

"The whole of the section when developed, will, in addition to a public garden having an area of about three acres, comprise 568 cottages of varying types, and we propose that as a first instalment thirty-two first-class or five-roomed cottages, forty-four second-class or four-roomed cottages, and forty-six third-class or three-roomed cottages, or 122 cottages in all should be erected. It appears to us that the course of procedure adopted with regard to the cottages which are being built on section B should be followed on this occasion, and we hope to be able at an early date to submit a definite recommendation as to the contractor to be employed on the work. We have forwarded to the Finance Committee an estimate of 30,430*l.* in respect of the cost of erecting the cottages and finishing the roads already formed, together with all incidental expenses, and we recommend :—

(*a*) That the estimate of expenditure on capital account of 30,430*l.*, submitted by the Finance Committee, be approved in respect of the erection of 122 cottages and the finishing of roads on the first part of the Tower-gardens section of the White Hart-lane estate, such amount including provision for lithography articles to be bought direct, professional charges, and incidental expenses.

(*b*) That expenditure not exceeding 30,430*l.* be sanctioned in respect of the erection of 122 cottages and the finishing of roads, together with all work incidental thereto, on the first part of the Tower-gardens section of the White Hart-lane estate."

Improvements.—The following recommendations of the Improvements Committee were agreed to :—

"(*a*) That the estimate of expenditure on capital of 8,000*l.*, submitted by the Finance Committee, in respect of the widening of York-road, Wandsworth, be approved.

(*b*) That a contribution be made, on the usual conditions, of two-thirds of the net cost of the acquisition by the Council of the Metropolitan Borough of Wandsworth of the property needed for the widening of York-road . . . provided, however (i.), that if the total net cost exceed 12,000*l.* such contribution shall be limited to 8,000*l.*, and (ii.) that in the execution of the improvement no departure whatever be made from the approved plan, except with the previous sanction of the Council.

(*c*) That the estimate of expenditure on capital account of 7,270*l.*, submitted by the Finance Committee in respect of paving, etc., works in York-road, Wandsworth, be approved.

(*d*) That expenditure on capital account not exceeding 7,270*l.* be sanctioned in respect of the paving, etc., works necessary in connexion with the widening of York-road . . . subject to the Council of the Metropolitan Borough of Wandsworth agreeing to contribute one-third of the net cost of such works.

(*e*) That the estimate of expenditure on capital account of 5,900*l.*, submitted by the Finance Committee, in respect of the widening of Falcon-road, Battersea, be approved.

(*f*) That the Improvements Committee be authorised to arrange for the widening of Falcon-road, Battersea, in accordance with the plan presented to the committee on March 8, 1905, such plan being the plan of property the acquisition of which is provided for in the estimate of 5,900*l.*

(*g*) That the estimate of expenditure on capital account of 250*l.*, submitted by the Finance Committee, in respect of the widening of York-road at Lombard-road, Battersea, be approved.

(*h*) That, subject to the Council of the Metropolitan Borough of Battersea agreeing to bear one-third of the cost of the land, the land at the junction of York-road and Lombard-road . . . be added to the public way in York-road, and that a sum of 250*l.*, being the estimated cost of such land, be charged to the account of the improvement."

The Lowest Tender.—The Education Committee recommended :—

"(*a*) That new blocks of buildings be erected at the London County Council Westminster Technical Institute, Vincent-square (Westminster), and that consequent alterations be made to the existing buildings.

(*b*) That the tender of Messrs. Garrett & Son, of 17, Balham-hill, amounting to 21,490*l.*, be accepted for the erection of the new blocks of buildings at the Westminster Technical Institute, Vincent-square (Westminster), and for the consequent alterations to the existing buildings; that the solicitor do prepare and obtain execution of the contract; and that the seal of the Council be affixed thereto."

After discussion, it was agreed to give the work to Messrs. A. Hudson & Co., of Westminster. (The full list of tenders will be found in our "Tender" columns.)

Improvements: Alverton-street, Deptford.—The following recommendation was agreed to :—

"That the estimate of expenditure on capital account of 1,425*l.*, submitted by the Finance Committee in respect of (i.) the acquisition of additional property adjoining the Alverton-street school (Deptford), and (ii.) the preparation of finished plans, specification, and quantities in connexion with the scheme of proposed improvements at the school, be approved."

Residential and Day Training College, Avery-hill.—The following recommendations of the same Committee were agreed to after discussion :—

"That expenditure on capital account not exceeding 10,250*l.*, for the adaptation and equipment of the building at Avery-hill for the purposes of a training college be sanctioned.

That a day and residential training college for women be established at Avery-hill, Eltham (Woolwich), and that the mansion, brick stable, and machinery house thereat, together with certain adjacent land, including the area occupied by such buildings, amounting to a total not exceeding four acres, be utilised for the purposes of such college to accommodate sixty residential and 200 day students."

Offer of a Site for a Secondary School by the Governors of Dulwich College.—The same Committee recommended, and it was agreed :—

"That the offer of a site for the erection of a secondary school in Dulwich made by the estates governors of Dulwich College, subject to the undermentioned conditions, be accepted :—

(i.) That the estates governors of Dulwich College and the governors of James Allen's Girls' school together shall be accorded representation equal to that of the Council on the advisory committee of management of the said projected school.

(ii.) That the external design of the projected school shall be agreed upon by the Council and the estates governors; and

(iii.) That the Council use its influence with the Board of Education to facilitate the assent of the Board to the proposals, and also to the proposals in regard to the development of the James Allen's Girls' school which are now before the Board."

Acton Drainage.—The Main Drainage Committee recommended, and it was agreed, that an agreement be entered into with the Acton Urban District Council authorising it to allow the connexion with the metropolitan main drainage system of new houses built or to be built within the district.

Drury-lane Theatre.—The Theatres and Music-halls Committee reported as follows :—

"We reported on May 10, 1904, that notice of appeal had been given against the sealed notice under the Metropolis Management and Building Acts Amendment Act, 1878, which was served on the owners of Drury-lane Theatre on April 26, 1904, and the Council accordingly authorised all necessary steps to be taken for the appointment of an arbitrator, and for upholding the requisitions before such arbitrator. Mr. John Slater, Vice-President of the Royal Institute of British Architects, was appointed by His Majesty's First Commissioner of Works to act as arbitrator in the matter. After an exhaustive inquiry, the arbitrator made a provisional award on August 10, 1904, and his final award on May 3, 1905. We have been in correspondence with the arbitrator regarding certain points of detail arising out of his final award, and we are now in a position to report the effect of the award upon the requirements made by the Council. The sealed notice contained 143 requirements, and the following summary shows briefly the decision of the arbitrator with reference thereto :—

Requirements complied with in their entirety, in accordance with the terms of the sealed notice, or as originally suggested by the Council	92
Requirements confirmed in principle, but modified in detail	27
Requirements not relating to structural matters, but the carrying out of which the arbitrator considers desirable	4
Requirements not relating to structural matters which the arbitrator considers should be settled between the Council's officers and the representatives of the owners of the theatre	5
Requirements not confirmed	14
Requirements upon which no order is made	1
	143

The modifications made to the Council's requirements, in the cases where the requirements were varied, do not call for remark. The requirements which were not confirmed by the arbitrator are as follows :—

No. 21. Cutting off stalls refreshment-bar so as not to form pockets.

No. 29. The abolition of single steps in the doorways from the rotunda to the vestibule.

No. 30. The removal of the lock from the door to the rotunda.

No. 31. The separation of the fire risk of the seat store from that of the vestibule.

No. 33. The provision of central hand-rails to the grand staircase.

No. 34. The widening of the doors to the grand saloon.

No. 48. The prohibition of the use of the tunnel as a dressing-room.

No. 73. The cutting off of the electric switch-box from the stage.

No. 95. The provision of a second fire curtain.

Nos. 108 and 109. The alteration of the small brick chamber on the roof of the portico in Catherine-street.

No. 133. The renewal of the signs in front of the building on the Catherine-street frontage.

No. 139. Requiring an undertaking not to use any of the disconnected, or, at present, unused parts of the heating apparatus without first informing the Council.

No. 140. The provision of a lock-up safety valve to the steam boiler for stage effects, and, in certain circumstances, a reducing valve to the steam supply pipe.

With regard to the requirements relating to the provision of means of exit from the gallery, the award of the arbitrator is more stringent than the Council's sealed notice; the arbitrator having decided not to accept the reconstruction of two of the existing gallery staircases and the provision of only two new staircases, but to require the construction of four new staircases from this part of the house. Requisition No. 97, relating to the fire-proofing of the stage, which was included after the decision of the owners to go to arbitration, was fully confirmed by the arbitrator.

The award provided that the owners of the theatre should pay the cost of both the provisional and final awards, amounting to 309*l.* 2*s.* 6*d.* and 441*l.* respectively, and the Council's costs, which, as we reported on April 18, 1905, were taxed at 362*l.* 8*s.* 2*d.*

The arbitrator states in his final award that the works required by him in his provisional award have been carried out to his satisfaction.

We are of opinion that the result of the arbitration fully proves the reasonableness of the Council's requirements."

New Theatre, Shaftesbury-avenue, Wardour-street, and Little Rupert-street.—The Theatres and Music-hall Committee reported that they had considered plans submitted by Mr. W. G. R. Sprague, on behalf of Mr. Seymour Hicks, showing the arrangements proposed to be adopted in the construction of a new theatre in Shaftesbury-avenue, with frontages to Wardour-street and Little Rupert-street. The applicant has agreed to surrender the land required for the widening of Wardour-street to 40 ft. at the part in question, and as a result the site will comply with the regulations of the Council. Accommodation is shown for an audience of 1,172 persons seated and 130 standing. The Committee recommended that the plans be approved on certain conditions, and this was agreed to.

Proposed Music-hall, Tooting.—The same Committee reported that they had considered plans submitted by Messrs. Rings & Myers showing the arrangements proposed to be adopted in the construction of a music-hall in Upper Tooting-road. The plans show that the hall will be one with two tiers above the ground floor, the highest point of the top-most tier being 37 ft. above the street level. The site of the proposed building is isolated, and, together with the arrangements of the building generally, complies with the Council's regulations. Accommodation is shown for 1,420 persons seated and 556 standing. The Committee recommended accordingly, and it was agreed.

Collapse of the Roof of Charing-cross Station.—The Building Act Committee submitted a report on this disaster, in the course of which they said :—

"The theatre and the station building were at once surveyed by the District Surveyor, and condemned as dangerous, and, on December 8, 1905, an order was obtained at the Bow-street Police Court against the owner of the theatre for the removal of the dangerous portions of that building. As regards the station a notice has been served on the railway company requiring them to take down the walls fronting Brewer's-lane and Villiers-street, which are defective, also to take down the roof and iron trusses where decayed, broken, or otherwise defective, and to secure any other work that is in a dangerous condition.

We may point out that it is the Council's duty, under Part IX. of the London Building Act, 1894, when it is made known that any structure is in a dangerous state, to take the necessary steps to obtain an authoritative certificate as to the condition of the structure, and then to call upon the owner thereof, by notice, to remove the danger. In the event of such notice not being complied with, the Council can apply to a magistrate for an order on the owner to remove the danger, and, in default of compliance with the order, the Council is empowered to remove the danger.

The circumstances attending the case of Charing Cross Station are quite exceptional. The roof of the station has a span of 163 ft., and the plates of the roof girders are about 60 ft. above Villiers-street, and, in view of the special circumstances of the case, we have appointed Mr. Arthur Ashbridge, District Surveyor for St. Marylebone, to act in conjunction with the interim district surveyor for the district, Mr. A. B. Hayward, in connexion with the dangerous structure proceedings, and reports have been received from them to the effect that they have been assured by the railway company's engineer that the works indicated in the Council's notice will be proceeded with as rapidly as possible. Having regard, however, to the importance of the issues involved, we have requested the two surveyors to consult the Superintending Architect and the Chief Engineer of the Council whenever they think it necessary to do so, but it may be found desirable to obtain independent advice, and we therefore have to ask for authority to engage the services of an engineer to advise in the matter should such a course be found to be necessary. We are not at present able to state what fee would have to be paid for the services of an engineer of high standing in the profession, but the amount would be chargeable against the Annual Maintenance Estimates 1906-6, in respect of dangerous structures."

They recommended accordingly, and the Council agreed.

Fire Stations.—The following recommendations of the Fire Brigade Committee were agreed to:—

"That, in the event of the Works Committee being prepared to undertake the work at the amount of the architect's revised estimate, the work of erecting the new Knightsbridge fire station be executed by the Council without the intervention of a contractor.

That, in the event of the Works Committee not being prepared to undertake the work of erecting the new Knightsbridge fire station at the amount of the architect's revised estimate, tenders for the erection of the station be invited from selected firms.

That expenditure not exceeding 9,580*l.* be authorised in connexion with the erection of the proposed Plumstead fire station.

That, in the event of the Works Committee being prepared to undertake the work at the amount of the architect's revised estimate, the work of erecting the Plumstead fire station be executed by the Council without the intervention of a contractor.

That, in the event of the Works Committee not being prepared to undertake the work of erecting the Plumstead fire station at the amount of the architect's revised estimate, tenders for the erection of the station be invited from selected firms.

That expenditure not exceeding 9,590*l.* be authorised in connexion with the erection of the proposed Upper Holloway fire station.

That, in the event of the Works Committee being prepared to undertake the work at the amount of the architect's revised estimate (to be reported after the Christmas recess), the work of erecting the Upper Holloway fire station be executed by the Council without the intervention of a contractor.

That, in the event of the Works Committee not being prepared to undertake the work of erecting the Upper Holloway fire station at the amount of the architect's revised estimate, tenders for the erection of the station be invited from selected firms."

Tramways.—The following recommendations of the Highways Committee were agreed to:—

"That the estimate of expenditure on capital account of 2,350*l.*, submitted by the Finance Committee, be approved in respect of the acquisition of a site at Hackney for an electricity substation for the Council's (Northern) Tramways.

That expenditure, on capital account, not exceeding 2,350*l.*, be sanctioned in connexion with the acquisition of a site for an electricity substation at Hackney.

That the Shoreditch Metropolitan Borough Council be again asked to give its consent to the construction of single lines of tramways along Curtain-road and Harwar-street, for use alternately with the existing single lines in Old-street and Kingsland-road.

That, subject to a satisfactory agreement being arrived at with the Middlesex County Council, the consent of the Council be given under seal, for the purposes of the standing orders of Parliament, to the introduction of a Bill to authorise the Middlesex County Council to construct tramways in the County of London.

That the Highways Committee be authorised to agree terms with the Middlesex County Council in respect of the construction of the tramways referred to in the foregoing resolution, providing for the granting of mutual running powers over the lines, subject to the terms of any such agreement being submitted to and approved by the Council before it is finally settled."

Housing.—The following recommendations of the Housing of the Working Classes Committee were agreed to:—

"That the estimate of expenditure on capital account of 1,750*l.*, submitted by the Finance Committee, be approved in respect of a part of the Council's contribution towards the cost of carrying into effect the Brantome-place and Prospect-terrace, St. Pancras, schemes, 1896, under Part II. of the Housing of the Working Classes Act, 1890.

That the offer of Messrs. F. & T. Thorne to erect two blocks, Nos. 6 and 7, of cottages on section A of the Norbury estate, in accordance with a modified specification, and allow a reduction of 3 per cent. on the schedule of prices contained in their contract with the Council, be accepted; that the Housing of the Working Classes Committee be authorised to complete such arrangements as they may deem desirable for the erection of block 8."

Stained-glass Panels, Fleet-street.—The Local Government, Records, and Museums Committee recommended, and it was agreed:—

"That the offer of Mr. C. Y. Sturge to defray the cost of inserting stained-glass panels in the windows of the Council Chamber at No. 17, Fleet-street, be accepted; that the work of preparing the panels and placing them in position be carried out under the supervision of the Council's architect; and that the thanks of the Council be communicated to Mr. Sturge for his gift."

Marble-hill Mansion.—The Parks and Open Spaces Committee recommended, and it was agreed:—

"That the resolution of October 31, 1905, accepting the tender of Mr. J. Christie of 767*l.*, for the adaptation for park purposes of the mansion at Marble-hill, be rescinded.

That the offer of Messrs. Chambers Brothers, of 800*l.*, for the adaptation for park purposes of the mansion at Marble-hill, be accepted."

The Aldwych Site.—Upon the reception of the report of the Improvement Committee,

Sir M. Beachcroft asked if it were true that a syndicate had offered 50,000*l.* a year for a building lease of the Aldwych site, and that that offer had been refused.

Mr. Horniman, chairman of the committee, replied that two or three syndicates were negotiating for a lease, and the committee would, in due course, report as to which offer they considered as most advantageous to the Council.

The Council adjourned, after sitting for seven hours.

APPLICATIONS UNDER THE 1894 BUILDING ACT.

THE London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

Chalk-farm and Highgate Stations.—Charing-cross, Euston, and Hampstead Railway.

Hampstead and St. Pancras, North.—Station buildings to be known as Chalk-farm and Highgate stations at the junction of Haverstock-hill and Adelaide-road, Hampstead, and on the west side of Junction-road, Islington, respectively (Mr. L. W. Green for the company).—Consent.

Lines of Frontage and Projections.

Brixton.—An addition to No. 205, Clapham-road, Clapham (Messrs. H. Wakeford & Sons for Mr. H. J. Doughty).—Consent.

Camberwell, North.—Eleven houses on the north side of Halsmere-road, Flodden-road, Camberwell, (Messrs. P. Arundell & Sons).—Consent.

Clapham.—Projecting porches to seven houses on the south side of Rodenhurst-road, Clapham (Mr. J. Carmichael).—Consent.

Dulwich.—Buildings on the site of Nos. 24, and 26, Peckham-rye, Dulwich, to abut also upon Nigel-road (Mr. W. T. Champion).—Consent.

Wandsworth.†—Buildings on the south side of Upper Richmond-road, Putney, eastward of Roehampton-lane (Mr. E. J. Partridge for Mr. H. J. Hawkins).—Consent.

Holborn.—An iron and glass shelter in front of the main entrance to the Hotel Russell, Russell-square, Holborn (Messrs. J. W. Singer & Sons, Ltd., for the Fredericks Hotel Company).—Consent.

St. George, Hanover-square.—Five projecting pilasters on the Piccadilly frontage and five projecting pilasters on the Old Bond-street frontage of buildings upon the site of Nos. 44, 45, and 46, Old Bond street, and Nos. 57, 58, 59, and 60, Piccadilly, St. George, Hanover-square (Messrs. Read & MacDonald).—Consent.

Strand.—Addition of iron brackets and electric lights to an iron and glass shelter at the entrance of the Gaiety restaurant, Strand (Messrs. Jones & Willis, Ltd.).—Consent.

Wandsworth.—A building with a projecting balcony in front on the southern side of the Embankment, Putney, eastward of Ruvigny-mansions (Messrs. Bartlett & Ross for Mr. G. Ayling).—Consent.

Brixton.—No. 22, Atherfold-street, Stockwell, with a projecting portico (Mr. V. Vagnolini for Mr. W. P. Goosey).—Consent.

Wandsworth.—Two houses, with bay windows and porches, on the north side of Garratt-lane, Lower Tooting, between the houses known as Copplestone House and No. 1, Alice-terrace (Messrs. W. & C. Brown).—Consent.

Wandsworth.—One-story shops in front of Nos. 3 to 10 (inclusive) and 13 to 16 (inclusive), Magdalen-parade, Garratt-lane, Earlsfield (Messrs. T. Sheppard & Co.).—Consent.

Camberwell, North.—Buildings on the south-east side of Wyndham-road, Camberwell, at the rear of the "Clarendon" public-house (Mr. F. A. Powell for Mr. W. Smith).—Refused.

Lewisham.—Additions to No. 154, Stanstead-road, Lewisham, to abut upon Colfe-road (Mr. G. Tolley for Dr. A. McLean Cato).—Refused.

Lewisham.—Buildings upon the site of Nos. 299 and 301, Stanstead-road, Lewisham, to abut upon Stanstead-road and Ravensbourne-road (Messrs. Norfolk & Prior for Mr. J. Watt).—Refused.

Marylebone, West.—Buildings on the north-east side of Maida Vale, Marylebone, to abut upon Maida Vale and St. John's Wood-road (Mr. V. S. Galsworthy for the Governors of Harrow school).—Refused.

Paddington, North.†—The re-erection of Nos. 7½, 8, 9, and 10, Paddington-green, Paddington (Messrs. W. F. Meakin & Son for Messrs. Brooks, Phillips, & Co.).—Refused.

Rotherhithe.—Buildings on the site of No. 247, Lower-road, Deptford (Mr. J. H. Bethell for Mr. H. Bellsham).—Refused.

St. George, Hanover-square.—A projecting showcase in front of No. 60, New Bond-street, St. George, Hanover-square (Madame S. Godward).—Refused.

Width of Way.

Hoxton.—Buildings with external walls at less than the prescribed distance from the centres of the roadways of Wood's-buildings and King John's-court, Great Eastern-street, Hoxton (Mr. T. H. Smith for Messrs. Brown Brothers, Ltd.).—Consent.

Newington, West.—A building at the rear of No. 119, Newington Butts, Newington, with external walls at less than the prescribed distance from the centre of the roadway of Rose-court (Mr. H. L. Florence for Mr. A. E. Chittenden).—Consent.

Woolwich.—A building on the east side of a passage-way at the rear of houses on the east side of Herbert-road, Plumstead, northward of Love-lane (Messrs. W. Marriage & Co. for Mr. W. Sutch).—Refused.

City of London.—A building upon the site of Nos. 75 and 76, Lombard-street, City, with external walls at less than the prescribed distance from the centre of the roadway of such street (Mr. M. E. Collins for Messrs. Slazenger & Son).—Refused.

Peckham.†—Fences in front of Nos. 1 and 3, Wagner-street, Peckham, at less than the prescribed distance from the centre of the roadway of such street (Mr. J. P. Choate for Mr. B. Gale).—Refused.

Width of Way, Lines of Frontage, and Deviation from Certified Plans.

Finsbury, Central.—A block of flats on the eastern side of St. John-street, Clerkenwell, to abut also upon Rawstorne-street (Mr. A. Kent for Mr. G. E. Chamberlain).—Consent.

Lines of Frontage and Construction.

Kensington, South.—The retention of a cycle house of a temporary character in front of No. 26, Victoria-road, Kensington (Mr. D. F. Pennant).—Consent.

Clapham.—The retention of a cycle house of a temporary character erected in front of No. 22, Sisters'-avenue, Battersea (Mr. J. W. Mead).—Consent.

Finsbury, Central.—Three iron gangways to connect at the first, second, and third floor levels, Nos. 67, 68, and 69, Turnmill-street, and No. 3, Printers'-buildings, Broad-yard, Finsbury (Mr. R. A. Jack for Messrs. R. S. Murray & Co.).—Consent.

Holborn.—Two iron gangways connecting the first and second floors of buildings on the north and south sides of Kennedy-court, Newton-street, Holborn, and two inclined iron gangways and an iron ladder in front of the buildings on the south side of the same court (Mr. J. Walters).—Consent.

Hackney, North.—Retention for a further period of a wood and iron covered way of a temporary character at the entrance to No. 97, Stamford-hill, Hackney (Mr. F. Tite).—Consent.

Westminster (detached).—Two iron and glass shelters in front of the Hyde-park Hotel, Knightsbridge (the Crittall Manufacturing Company, Ltd., for the Hyde-park Hotel, Ltd.).—Refused.

Formation of Streets, etc.

Norwood.—A deviation from the plans approved for the formation or laying-out of new streets for carriage traffic, upon the Highview-park estate, Canterbury-grove, West Norwood, so far as relates to the formation or laying-out of the street known as Broxholme-road, where it adjoins Leigham Court-road of a less width than 40 ft., for the purpose of strengthening the retaining wall on the south side of that street (Mr. J. C. Radford for Mr. J. Wilson).—Consent.

Norwood.—That an order be issued to Messrs. Douglas, Young, & Co., sanctioning the formation or laying-out of a new street for carriage traffic to lead from Brixton-hill to Lyham-road, Norwood (Messrs. F. W. E. Hookey, W. J. Peall, W. T. Key, and R. W. Brading).—Consent.

Wandsworth.†—That an order be issued to Mr. E. J. Partridge sanctioning the formation or

laying-out of new streets for carriage traffic upon the Roehampton-lodge estate, Upper Richmond-road, Putney, and in connexion therewith the widening of Upper Richmond-road and Roehampton-lane (for Mr. H. J. Hawkins).—Consent.

Greenwich.—That an order be issued to Mr. C. Carpenter, sanctioning the formation or laying-out of a new street for carriage traffic to lead from Blackwall-lane to Grenfell-street, East Greenwich, and in connexion therewith the widening of Grenfell-street (for the South Metropolitan Gas Company).—Consent.

Greenwich.—That the Council in connexion with its sanction to the formation or laying out of new streets for carriage traffic upon the Page estate, Vanbrugh-fields, Greenwich, to lead out of the south side of Westcombe-park-road and the eastern side of Park-wall, do permit the erection of buildings on the plot of land coloured red on the plan submitted by Mr. W. J. Kemp with his application on behalf of Mr. C. H. Polhill, for a modification of the conditions upon which such streets were sanctioned).—Consent.

Lewisham.†—That an order be issued to Messrs. Norfolk & Prior, refusing to sanction the formation or laying-out of streets for carriage traffic to lead out of the east side of Ravensbourne-park, and the north side of Westdown-road, Lewisham (for M. A. E. Rudd).—Refused.

Woolwich.—That an order be issued to Mr. F. C. Henesy, refusing to sanction the formation or laying-out of a street for foot traffic only at the rear of houses on the east side of Godfrey-street, Woolwich.—Refused.

Deviation from Certified Plans.

Marylebone, East.—Deviations from the plans certified by the district surveyor, under sect. 43 of the Act, so far as relates to the proposed erection of a building on the site of No. 11, Welbeck-street and No. 1, Little Welbeck-street, Marylebone (Mr. F. M. Elgood for Mr. W. Hughes-Payne).—Consent.

Holborn.—Deviations from the plans certified by the district surveyor, under sect. 43 of the Act, so far as relates to the proposed erection of buildings on the site of Nos. 8 and 10, Parker-street, Drury-lane (Messrs. Davis & Emanuel for the Society for Improving the Condition of the Labouring Classes).—Refused.

Space at Rear.

Strand.—A modification of the provisions of sect. 41 with regard to open spaces about buildings, so far as relates to the erection of Nos. 169 and 170, Piccadilly, with an irregular space at the rear (Mr. W. Woodward for Messrs. Leon).—Consent.

Working-Class Dwellings.

Camberwell, North.—Dwelling-houses to be inhabited by persons of the working-class, and proposed to be erected on a site at the rear of dwellings on the south side of Picton-street, Camberwell (J. A. J. Woodward & Sons for Mr. J. Dennis).—Refused.

Dwelling-Houses on Low-Lying Land.

Peckham.—A dwelling-house on low-lying land situated at Culmore-road, Peckham (Mr. J. P. Choate for Mr. S. Bryant).—Consent.

The recommendations marked † are contrary to the views of the local authority.

ARCHITECTURAL SOCIETIES.

MANCHESTER SOCIETY OF ARCHITECTS.—Mr. C. H. Heathcote lectured, on the 14th inst., before the Manchester Society of Architects, on the lessons that are to be learned from America in the erection of buildings. Only one superiority in building methods, he said, had ever been claimed for the American—the claim of speed in construction. It was an important claim, and a just one, but its importance and justness had been exaggerated. The methods adopted by Americans were not in general vogue amongst English contractors, and yet many English firms, in a quiet English way, achieved just as much as any American, and on similar lines. But in a general sense English contractors and English architects might learn much from America, particularly as to the value of speeding up work. Architects should strive especially to complete their drawings early; contractors should realise that it was an all-round advantage both to themselves and to proprietors to complete work as soon as possible. Mr. Heathcote guarded himself carefully against appearing as an advocate of hustling, but he thought that a walk down Whitehall and a sight of a five-story building that had taken eight years to construct and still had no roof on should make one feel rather ashamed of English contractors' methods. He denied that American workmanship can hold its own with British; in New York the best brickwork is that done by English bricklayers; and he suggested as an ideal combination the quiet, self-respecting determination of the English contractor's methods, coupled with the better organisation that the Americans have mastered. To encourage this there must be inducements—the proprietor must realise that it is to his advantage to get work speeded up, and must be ready to pay for it, so that contractors and architects and workmen all along the line may have added keenness in their work. It is the offer of an incentive, Mr. Heathcote says, that keeps up the enthusiasm of the American in his work, and the absence of incentive leaves the young Englishman comparatively listless. "Where will you find a building-construction clerk so anxious about his work," Mr. Heathcote asked, "as he is about the result of a football match?" On important works, he urged, there should be bonuses for completion before time at the same rate as the penalties for delay of completion, so that the contractor would have some real inducement to perfect his organisation and get the best possible results from those whom he employed. The greater freedom of workmen in America from trade union restrictions Mr. Heathcote considered to be a distinct advantage, and he argued that labour organisations made a grave mistake when, by disciplinary action, they blocked economic progress.—*Manchester Guardian.*

LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.—At the rooms of this Society, on Thursday, the 14th inst., Mr. H. W. Wills read a paper on "The Architectural Planning of Public Buildings," Mr. G. B. Bulmer, President, in the chair. Architects, he said, often lost sight of possibilities open to them of planning the skilful arrangements of masses of building so as to appeal to the imagination and to produce those effects of beauty and interest which form an essential feature of great architectural works of all ages. Greek architecture, perfect as it was in its limited field, had given them few lessons in planning, while, on the other hand, in some Egyptian temples they found conceptions not surpassed in their mystery and grandeur by any mediæval cathedral. It was Roman work—its basilicas, baths, theatres, amphitheatres, and palaces—which showed most clearly how far a magnificent and poetical conception might obliterate their sense of dissatisfaction at indifferent and other coarse architectural detail. None of the mediæval churches were so fruitful in suggestions for modern use as were the Basilican and Byzantine types of planning. Wren's ability as a planner could be best judged by his smaller churches, and it was difficult to imagine why Wren's interiors had not been taken as models for Dissenting chapels, in place of the hideous nightmares often afforded by such chapels, especially in Wales. Italian palaces afforded valuable lessons in planning, and the courtyard principle might be well adopted in many modern buildings. Some of the most valuable lessons in stately planning were found in the works of English architects, from the time of Wren and Inigo Jones to that of Sir William Chambers. Curiously enough, it was in designs of a domestic nature that they frequently found most fertile suggestions for public buildings. Greenwich Hospital he instanced as one of the finest groups of buildings in this country. There had been a great advance in the planning of libraries, especially in some of the recent American designs. In dealing with small schemes for public buildings, they should refrain from using all the site, and adopt a concentrated group of buildings, which were more convenient.

SHEFFIELD SOCIETY OF ARCHITECTS.—The monthly meeting of the Sheffield Society of Architects and Surveyors was held in the Lecture Hall of the Literary and Philosophical Society, Leopold-street, on the 14th inst., Mr. E. Holmes, President, in the chair. Mr. S. E. Fedden, A.M.Inst.C.E., general manager of the Sheffield Corporation Electric Supply Department, delivered a lecture dealing with "The Uses of Electricity in Modern Buildings." Speaking of lighting by electricity, he remarked that the invention of the electric incandescent lamp gave a great impetus to electrical illumination. The modern incandescent lamp was the result of many years of patient labour on the part of inventors and manufacturers, and the number now used per annum in the United Kingdom must be in excess of fifty millions. The majority were home-made. It paid the consumer to purchase a good incandescent lamp, which had many advantages over a cheaper, second-rate article. For effective illumination, lamps should be hung so as to be easily avoided by the eye. The amount of light required to produce a satisfactory illumination could not easily be stated by any particular rule. Although shades stopped some of the light emitted by the lamp, they tended greatly to heighten the illuminating effect by shielding the eye from the direct rays, and thus allowing the pupil to open to greater extent. In the arrangements of the lights and switches lay the greatest possibility of economy in the use of electricity, and it would pay every intending consumer to consult his architect on the matter. Mr. Fedden proceeded to show how the electrical installation should be placed in the various rooms of an ordinary dwelling-house, detailing the varying positions for the lamps in the different rooms. He mentioned that in the electric lighting of a dwelling there was great scope for scientific and artistic work. The lighting of shops, although very varied work, always calling for change and novelty, had not yet in any sense become an exact science. A walk down the principal streets of Sheffield would enable anyone to obtain an idea of what could be done in that direction. One of the most successful fields for electricity was in the lighting of places of worship. The lights were placed only where required, and the method was effective and economical. After alluding to the various kinds of arc lamps, the lecturer proceeded to speak of electricity as used in heating and cooking. Apart from its many other great advantages the cost of electrical cooking was extremely low. The cost of heating one pint of water to boiling-point was approximately one-fifteenth of a penny. The time taken to cook food varied very much with the food, but a kettle giving 90 per cent. efficiency and taking half a unit per hour would raise 1½ pints of water from 60 deg. F. to boiling-point in twelve minutes. Three or four heats were obtainable on all cooking apparatus. The heating of rooms and buildings could be accomplished by either radiant or convected heat. With the former method heating was effected by the agency of glow-lamps, and with the latter method by resistances working at comparatively low temperatures. The difference between the two methods of heating was a very wide one, the best method to employ depending entirely on the nature of the work for which the heaters were required. It was necessary in deciding which type of heater would give the most satisfactory result to know the purpose for which it was to be used, and the conditions under which it would work. The glow-lamp was suitable for use out of doors and in balconies, owing to the heat being unaffected by air currents. Heating by electricity was not costly, the estimated cost of burning a four-lamp heater being 1d. per hour. The electric stove possessed great advantages over either coal or gas. They were very suitable for chimneys which had down draughts, and for places where it was impossible to have flues, whilst for bedrooms and sick-rooms the electric stove was practically indispensable. Of the many electrical medical appliances, the one most likely to be widely used was the radiant heat bath, a sort of artificial solarium. It consisted of a cabinet lined with mirrors, with electrical lamps fixed inside. The heat was reflected upon the patient, thus producing perspiration. Owing to the heat being dry, temperatures of three times that of a moist heat could be borne by the patient. The question of electric ventilating had received much attention from architects. For this purpose electric fans were eminently suited, owing to the ease with which they could be fixed to run in any position, and the little attention they required. They were now being largely used in all classes of workshops and factories. Electrically-worked elevators promised soon to displace every other form, being economical to work and reliable. The lecturer proceeded to quote figures showing the saving effected in the cost of running suitable machinery by electricity as against coal, and concluded by hoping that, when his audience heard the oft-repeated statement that electricity was in its infancy, but would be the power of the future, they would think of the many uses to which it was put at the present time.—A hearty vote of thanks was accorded on the proposal of Mr. E. Holmes, seconded by Mr. W. C. Fenton.

YORK ARCHITECTURAL SOCIETY.—On the 15th inst. the annual dinner of the York Architectural Society was held in the Davy Hall Restaurant, Davygate, Mr. Arthur Pollard, President, in the chair. The Lord Mayor gave the toast of "The Royal Institute of British Architects and the Allied Societies." After sketching the inception and progress of the Institute, he said he understood that during the past entry to the Institute was to a great extent by examination. Still it was possible for Associates to be elected without the test. He was very pleased to learn that after December of next year it would be impossible for anyone to become an Associate of the Institute without passing an examination to show their fitness. He thought this was a step in the right direction, and those already associated with the Institute would agree that it should be made a little more difficult for others to join. He congratulated them upon having such a strong Institute, and he wished it further success. He did not know any place so badly off for houses between 50*l.* and 100*l.* a year as York, and that was a great pity, because people who came to York might settle down if they saw such dwellings. Mr. E. T. Hall, in reply, said that when the Government brought in the last Public Health Bill it was sent down to the Royal Institute for suggestions, which were gladly given, therefore the Institute did something salient for the benefit of the health of the public. He would have them join in thinking that the profession of architecture was one of the noblest. What would we know of Egypt but for its monuments? It was by the architecture that we knew what manner of people they were, and what grand things they did. Mr. Butler Wilson, also replying, said there had been a gradual evolution in the history of the Institute from the voluntary to the compulsory condition, and the chapter would be dated from 1834 to 1906. Mr. Belcher, the President, had suggested that they set to work to educate the public. It was obvious that side by side with the more systematic training of the architect more should be done to enlighten the public. But another suggestion was made, and that was the question of registration. He believed that there were men who would have the doors of the Institute closed to them, although they would be quite entitled to practice as architects. Was it desirable that they should be left outside? Was it fair that unqualified and uneducated men should be allowed to compete with qualified and educated men? Certainly not. He was very glad that there was a committee of the Royal Institute, of which he was a member, considering this matter, and it was particularly pleasing to observe the interest which the provincial members took in the business of the meetings. Mr. J. G. Butcher, K.C., M.P., submitted the toast of "The York Architectural Society," and congratulated the members on the successful career of the Society. It was founded nearly twenty-five years ago for the purpose of facilitating architectural and cognate studies. It had gone on increasing its membership, and had furthered its objects by various valuable methods. They were fortunate in Yorkshire in having the opportunity for studying almost every variety of architecture that existed in the land. There were many things which architecture had solved, but he believed there were still unsolved mysteries of the art. There were the round towers of Ireland, on the subject of which he had scarcely heard two people have the same opinion. The Chairman, in response, said the Society was sound financially, but, unfortunately, the area of operation in the county which had been alloted them by the Institute was mainly an agricultural one. They were not favoured with very many large towns, and their membership was scarcely equivalent to the area. He believed it did not include all the architects in the area, and he hoped these gentlemen would recognise the importance of the Society and join. He was sure that the registration of architects would lead to a better class of architecture. Mr. A. B. Burleigh proposed "The Archbishop of York, Clergy and Ministers of all Denominations," and said that if there was any fault to be found with the flying buttresses on the Minster it was not the fault of Mr. Bodley, but the fault of the designer in the first instance. The Rev. H. Robinson responded. Mr. H. Davis proposed "The Guests," to which the Sheriff of York replied. He deplored the advertisements which defaced York, and he wished the Corporation would do something to remove these things, which marred the beauty of the city. Alderman H. V. Scott acknowledged also, and expressed the hope that many pupils would attend the architectural classes provided for them by the Education Committee.

NORTHERN ARCHITECTURAL ASSOCIATION.—A meeting of the Northern Architectural Association was held, on the 13th inst., in the meeting-room, Higham-place, Newcastle, the President (Mr. J. T. Cackett) presiding. The assessors' award was given by Messrs. Cackett and H. C. Charlewood in connexion with the "Measured Drawings" and "Sketches" competition. In the "Measured Drawings" competition Mr. Wilfred Lawson, of Gateshead, was given the first award, and Mr. Wm. Riddle, of Newcastle, was placed second. In the "Sketches" competition Mr. Arnold A. Constable, of Stockfield-on-Tyne, was placed first, and Mr. G. E. Matkin, of Sunderland, second. A lecture was given by Mr. Thomas Preston, ex-President, of Burnley, entitled "Italian Art and Travel." The lecture was illustrated, and Mr. Preston pointed out many of the beauties and features of Italian architecture and art.

EDINBURGH ARCHITECTURAL ASSOCIATION.—At a meeting of the Edinburgh Architectural Association, held on Wednesday, the 13th inst., Mr. H. O. Tarbolton, President, occupied the chair, and Mr. T. J. Gueritte, Newcastle-on-Tynt, delivered a lecture on "Ferro-concrete Construction." The lecturer referred particularly to the Hennebique ferro-concrete, and explained its uses, advantages, and various applications to buildings, bridges, bad foundations, reservoirs, etc. The lecture, which was illustrated by lantern slides, was followed by a discussion.

ENGINEERING SOCIETIES.

INSTITUTION OF CIVIL ENGINEERS.—At the ordinary meeting on Tuesday, the 19th inst., Sir Alexander Binnie, President, in the chair, the paper read was "Heat Economy in Factories," by Mr. H. A. Mavor, M.Inst.C.E. The following is an abstract of the paper:—In an investigation undertaken in 1898 on the comparative costs of power in factories in the United Kingdom, the author found great difficulty in obtaining accurate data owing in many cases to the fact that the fuel consumed was applied for heating as well as for power. This circumstance appeared to offer inducements for further examination of the question, and the paper is an account of a method of inquiry which has resulted in the simplification of the problem and in the acquisition of useful results. The method consists in dealing with the heat-production and distribution by a system of double-entry accounts, in which the boilers are debited with the heat represented by the coal and credited with the heat represented by the steam. These credits are carried to the debit of accounts dealing with the various uses to which the steam is put in the factories. These accounts, again, are credited with the work performed, the balances being carried to a balancing account, which brings out the efficiency of the prime movers and separates out the useful work and the losses in such form that the losses can be divided into necessary and avoidable losses, the whole giving a comprehensive view of the conditions of efficiency in terms of British thermal units. Six specimen balance-sheets are given in the paper, and the accounts are shown in detail, the cases chosen being:—

"(*a*) A factory in which there is a small amount of heating and a number of steam-engines.
(*b*) A factory where the power is obtained from one large engine and the heating occupies a prominent place.
(*c*) A similar factory where there are many engines and a scattered and complicated heating system.
(*d*) A factory where there are a number of engines of various sizes and a considerable amount of heating and boiling.
(*e*) A factory similar to *d*.
(*f*) A blast-furnace plant."

The balancing accounts in each case are discussed in detail, and indications are given of the methods of arriving at the results, showing the bearing which the ascertained efficiencies have upon existing methods of working and proposed modifications thereof.

COMPETITIONS.

BRANCH LIBRARY FOR GREENWICH.—On Monday, the Libraries Committee of Greenwich Borough Council reported that a large number of drawings had been received from architects in response to the advertisements inviting designs for the branch library. They had instructed the Town Clerk to communicate with the assessor as to the arrangements to be made for adjudicating upon and exhibiting the designs.

SCHOOL, NORTHAMPTON. — Competitive designs were invited by the Northampton Borough Education Committee for the new Council school, which it has been decided to erect fronting St. George's-street and Royal-terrace. Twenty-five sets of plans were sent in by architects, and the assessor was Mr. H. O. Creswell, F.R.I.B.A., who placed first the plan marked "L," sent in by Mr. Matthew H. Holding, A.R.I.B.A., and second the plan marked "W," the joint authors of which were Messrs. Herbert Norman and W. D. Gibbins. According to the specifications the boys' department of the new school will contain seven classrooms, each of fifty places, thus providing accommodation for 350 scholars. In the girls' department there will also be seven classrooms, of fifty places each. In the infants' department provision is made for seven classrooms, of fifty places each, and one classroom of sixty places, making the total accommodation for the three departments 1,110.

LIBRARY IN OLD KENT-ROAD.—Southwark Borough Council is to invite designs for the erection of a branch library in the Old Kent-road. Provision is to be made for a lending department, a newsroom, a reference and magazine room, and three rooms for a caretaker. Premiums of 50*l.*, 30*l.*, and 20*l.* are to be offered for the three best designs submitted.

HOUSES, PORT SUNLIGHT.—Mr. W. H. Lever some time ago instituted a competition among members of the Liverpool Architectural Society, gentlemen in practice being invited to design seven cottages and assistants to compete with plans for five cottages. The winners in each competition will carry out the designs by building houses at Port Sunlight, the second being awarded a premium of 20*l.* The premiums have been awarded by a committee of architects as follows:—Architects—1, Messrs. Deacon & Horsburg; 2, Mr. T. Taliesin Rees. Assistants—1, Mr. Hazeby Adams; 2, Mr. T. J. Miller Reid.

BOOKS RECEIVED.

HINTS ON BUILDING A CHURCH. By Henry Parr Maskell. (*Church Bells* Office, London. 5s.)

BUILDER'S WORK IN ITS LEGAL ASPECTS. Edited by Paul N. Hasluck. (Cassell & Co. 6d.)

STATISTICS OF PUBLIC EDUCATION IN ENGLAND AND WALES. (Wyman & Sons. 2s.)

Correspondence.

IRON AND STEEL FOR CONSTRUCTION.

SIR,—Having been engaged on the design, construction, and maintenance of iron and steel to a large extent, I should like to make a suggestion as to the life of these materials. It may be taken as an axiom that all metals as they are taken from the earth are more lasting than those which man has refined, consequently cast-iron is more lasting than wrought-iron, and wrought-iron more lasting than steel. We have now arrived at a time when all wrought-iron structures built about the year sixty of last century, or before, should be carefully inspected and re-calculated for the loads they have to carry, and, where the iron is subject to more than 2½ tons per superficial inch in tension, these structures should be strengthened in all members in tension; the members in compression are not so important, as wrought-iron in compression does not lose its power to do its work so quickly as that in tension.

Engineers and architects have for many years been apt to treat cast-iron as a material almost out of date for constructional purposes. The prejudice has arisen from a "scare" as to its reliability, which was caused by the unfortunate failure of a railway bridge near London. The reason of this failure was due to heavier loads passing over at greater speed, added to which it had not been properly inspected before leaving the foundry; the outcome being that, on a suggestion from the Board of Trade, all cast-iron under bridges on railways were taken out, and replaced by iron or steel. In some cases the

new bridges are not so strong as the old ones, and certainly they will not be so lasting.

It is to be sincerely hoped that this scare is near its end, and that engineers and architects will look with more favour on cast-iron, particularly in cases where the structures cannot be properly maintained.

Cast-iron structures are practically as strong to-day as they were sixty years ago. The Crystal Palace is nearly all constructed of cast-iron, and is a grand example of the use to which this durable and useful material can be put.

W. H. TOMKINS, A.M.Inst.C.E.

STANDARDISING QUANTITIES.

SIR,—The suggestions contained in the letter from Mr. Henry Riley, published in your issue of December 16th, must, I think, commend themselves to all surveyors who take a keen interest in their profession, for no doubt a definite and uniform system of measuring has long been desired by many of us. I believe that in one of the large provincial towns a system was some years ago agreed between the surveyors and builders.

I think that the manner in which Mr. Riley suggests that the method of measuring in the various trades should be dealt with is eminently practical, but I suggest that it would be desirable to include a representative of the building trade in each committee. To attempt to obtain uniformity throughout the whole of the country would, I fear, be a hopeless task, and I presume, therefore, that whatever was agreed upon would be known as "The London System."

L. A. FRANCIS, F.S.I.

SIR,—I think Mr. Riley, in his letter on the this subject in *The Builder* of December 16, has opened a discussion of considerable interest to architects, quantity surveyors, contractors, and the building trades generally.

Without at present going into details, I desire to express my agreement with his views as to the desirability of arriving at some standard system in the preparation of bills of quantities for architectural works, and hope that others interested will avail themselves of your columns to express their views with the object of bringing the proposal to a successful issue. FREDK. BROWN, F.S.I.

HOLLOW WALLS.

SIR,—There is an opinion expressed in your most interesting article on "Rural Housing, etc.," in your issue of December 2, that would not, I think, hold good down here in South Devon. It is with regard to hollow brick walls, and your objection to them is because of the inaccessibility to the cavity except by vermin.

I have had considerable experience in the building of cavity brick walls, and have lived for seven years in a house so built myself, but have never heard of a single instance of the cavity being the source of trouble in any way.

There is an architectural feeling that a solid wall is better than one not solid. I myself would rather build solid walls, though only brick thick, if I consulted that feeling alone, but they would not keep out the wet, in this neighbourhood, even if rough cast in Portland cement. The bricks in these parts are not of the best, I admit, but I have yet to learn that a brick of good quality in a 9-in. solid wall rough cast in Portland cement would ensure a dry house. I feel convinced of the impossibility of making the house anything like as cosy all the year round as a 9-in. cavity *without* the rough cast. It does not matter how the wind blows, or the rain beats during weeks of unoccupation, it keeps perfectly dry and habitable all the time, and the contents remain uninjured.

It is quite true, as you say, that "you can never be sure that weak points will not develop in process of time," but that remark applies to all methods and all things, and I myself feel quite happy on that score about the cavity as about the solid wall, but I should like to know the opinion of others.

Plymouth. T. ROGERS KITSELL.

*** In saying that our remark that "weak points will develop in course of time" applies to all methods, Mr. Kitsell surely overlooks the real point of our criticism. If weak points develop where you can see them, the mischief can be remedied; but if they develop *where you cannot see them* or get at them, it is a very different matter. That is the basis of our objection to concealed hollow spaces of all kinds; you cannot tell what goes on there. Seven years is not a very long test for hollow walls. As to 9-in. brick walls, our opinion has always been (and still is) that no exterior brick wall should ever be less than 14-in.; but the people who desire to build cheap cottages seem to have all given this up as an economic impossibility, so that it is no use preaching; all we can say is, at all events give 9-in. walls some external coating.—ED.

FIRE-RESISTING STONE.

SIR,—In reply to "Clerk of Works'" enquiry in your issue of the 16th inst., probably the stone that will suit him is a "firestone" from Godstone, in Surrey; it belongs to the upper greensand formation, and is a soft, calcareous sandstone, with fine siliceous grains; colour, greenish light brown, weight 110 lbs. to the cubic foot.

It is used for building purposes, but chiefly to form the floors of glass furnaces, for which it is well adapted, as it resists the action of heat in a similar manner to the ordinary fire brick.

It is not a good weather stone, and therefore should not be used for external work, although stones from the vicinity of Godstone and Reigate, known by the various names of Reigate stone, Gatton stone, Merstham stone, etc., are used in several churches and modern buildings in the neighbourhood.

Thick bedded stones are not available in the "firestone" series, 12 in. being about the maximum thickness.

There is also another stone which is spoken of as having fire-resisting properties, namely "Minera" stone, from Berwig quarries, near Wrexham, Wales. It is a fine, close-grained sandstone, resembling Darley Dale stone in colour and appearance; weight, 142 lb. per cubic foot. This stone was used at Liverpool Municipal Offices by Mr. T. H. Wyatt, Manchester; Owens College, by Mr. Alfred Waterhouse; and, notably, at the National Safe Deposit Company's building, near Mansion House, London, by Mr. James Whichcord, who in 1876 wrote: "After seeing and testing various samples of sandstones I decided upon adopting the Minera stone for its fire-resisting qualities; a block of it about 6 in. cube was put into the middle of a furnace, where it remained for about an hour and a half. It was then taken out quite perfect, and on being plunged into cold water it neither cracked nor calcined in the least degree. Its cost in London was about the same as Portland stone, and it was no harder to work."

The beds of Minera stone run from 1 ft. to 5 ft. in thickness, and blocks of any reasonable size can be obtained.

It should be stated that it is also used as a fire-resisting stone in furnaces.

W. R. PURCHASE.

SPECULATIVE BUILDING.

SIR,—With reference to Mr. Forsyth's paper on this subject, the remedy for all the evils caused by this class of building rests almost entirely with the public. The utterly depressing appearance of our suburbs, thousands of acres of which are covered with houses of the most atrocious and vulgar appearance, is a serious social evil, and is primarily the result of a section of the public requiring at the hands of the purveyor of houses showiness combined with cheapness as a *sine quâ non*. With houses, as with furniture, the simplest are not always the cheapest, generally the reverse. Simplicity implies and demands good workmanship.

The application of meretricious ornament covers a multitude of sins.

In the great majority of speculative (formerly called jerry) building the whole of the joinery is purchased by the erector (I won't call him the builder) from firms executing or importing ready-made joinery, and the catalogue patterns of doors, windows, etc., are chosen from on the principle of most show for least money, the brickwork openings being made to suit the stock joinery.

The combination of stock joinery, stonework "carved" to stock pattern, lurid leaded lights, and startling plaster and cement work in gables, ceilings, etc., make a *tout ensemble* appealing to most of the speculative builders' clients. The remedy lies with them. Being so, neither the County Council, the Borough Surveyor, nor the Royal Institute of British Architects shall prevail. The case is hopeless.

ARTHUR R. MAYSTON.

COMPETITIONS.

SIR,—In the matter of competitions and competition reform, which we see discussed *ad nauseam* in the building papers, I think it is time that a word was said on the other side of the question. There are a number of members of the architectural world who seem to conclude that if their own efforts in a competition are unsuccessful, the said competition must have been badly assessed. A good, or rather a bad, example of this kind of thing is a letter from which I give the following selection:—"In this competition Mr. J. S. Gibson was the assessor, and the exterior of the successful scheme was strongly reminiscent of the Hull Free Library, both in detail and grouping." My own opinion (and I feel sure many will agree with me in this) is that the more the work of our young architects is influenced by such buildings as the Hull Free Library, the more hope there is for the successful development of a national style.

Such letters as the one from which I have quoted, and the ill-conditioned spirit that they show, must injure the prestige of the profession, and probably prevent many a building committee from adopting an assessor's decision or even from appointing an assessor at all.

VAL MYER.

*** We entirely agree with the general spirit of Mr. Myer's letter. The manner in which competing architects who have not been successful constantly set up a cry of unfairness, and an endeavour to upset the assessor's decision, is very discreditable. It is like disputing the umpire's word at cricket, which is considered to be a thing no gentleman would do.—ED.

SOLIHULL CHURCH.

SIR,—The mortuary chapel at Solihull parish church is now being restored, and the floor brought to its original level, and in digging down the workmen have come across an arched fireplace with flue and chimney. The date of the chapel is 1290, and the question arises—what use could have been made of the fireplace in such a position?

Could the chapel have been occupied by a church watchman? This is the only solution that occurs to me. The chapel is on the north side of the chancel, and the original floor is below the level of the chancel floor.

I should be greatly obliged for any light you can kindly throw upon the matter.

Solihull. J. BAGNALL.

COURT OF COMMON COUNCIL.

A MEETING of the Court of Common Council was held at the Guildhall on Thursday, last week, the Lord Mayor presiding.

Charing Cross Accident.—The Streets Committee reported that as a result of this accident they had at once instructed the Town Clerk to write to the various railway companies, urging the importance in the public interest of at once obtaining a report as to the stability and safety of the stations in the City.

Paving Works.—It was agreed, on the recommendation of the same Committee, to accept the tender of Messrs. Muirhead, Greig, & Matthews for paving a portion of Union-row with stone for the sum of 525*l.*, and to rescind the resolution of June 22 last, accepting a tender of Messrs. Watson & Co. for the said work; also that the Val de Travers Asphalte Company be called upon to maintain the carriageway pavement of Mansion House-street at 2s. 3d. per yd. super. per annum, and of Leadenhall-street (eastern end) at 1s. 6d. per yd. super. per annum, for a further period of fifteen years, in accordance with the terms of their contract. The Court also decided to carry out, at an estimated cost of 1,500*l.*, the paving works necessary in consequence of the improvement recently completed in Royal Mint-street.

Pollution of the Thames.—A report was presented by the Port of London Sanitary Committee as to the outstanding references before the Committee relative to the pollution of the estuary of the Thames, and submitted correspondence with the War Office authorities as to the discharge of sewage from military establishments into the Thames, and also as to representations made by the Committee to other authorities on the subject of sewage discharge. Mr. Blake said that one of the excuses of the War Office for not having carried out the work was that they had not sufficient money to do so. Mr. Morton stated that the Thames Conservancy had served the War Office with a threat to prosecute. As a result the work was done. He hoped the Corporation would do the same.

War Memorial.—The City Lands Committee reported on a reference as to the proposed memorial in the Guildhall of the Royal Fusiliers; and recommended that a memorial in bronze by Mr. Pomeroy should be allowed to be erected on the internal south wall in the three panels of the bay west of the main door, the cost, about 500*l.*, being borne by the applicants. This was agreed to.

Store-Room and Dwellings.—The Bridge House Estates Committee were authorised to expend an additional sum of about 350*l.* in connexion with the erection of store-room and dwellings at Tower Bridge.

The "Student's Column."—Owing to pressure of other matter this week, we are compelled to hold over our "Student's Column" article. In our next issue the two concluding chapters will be given.

QUEEN'S JUBILEE HOSPITAL, EARL'S-COURT.—The new out-patients' department was opened on December 2. The building includes, upon one floor, a new surgery, four consulting-rooms, dispensary, and operation theatre, erected at a cost of 2,500*l.*, after plans and designs by Mr. Blackford. The former out-patients' department will be cleansed and renovated for its conversion into a ward to receive nine in-patients. The board of management have in view, if their resources will admit, an extensive scheme for a general enlargement of the hospital in Richmond-road, at an estimated outlay of some 20,000*l.*

OBITUARY.

MR. H. H. COLLINS.—Mr. Hyman Henry Collins, of No. 61, Old Broad-street, and No. 39, Fenchurch-street, died at his residence, Frankfort House, Randolph-road, Maida Vale, on December 13, aged seventy-two years. Mr. Collins was elected an Associate in 1859, and in 1877 a Fellow, of the Royal Institute of British Architects. He was a Fellow of the Surveyors' Institution, District Surveyor for the City of London, Eastern Division, and a District Surveyor for Buildings and Dangerous Structures to the Corporation of the City of London. He was a member of Council, British Fire Prevention Committee; member of Council, Architects' Benevolent Society, 1903-5, and was re-elected for 1905-6 and Alderman and Chairman of the Public Health Committee, Paddington Borough Council, having been first elected as Alderman for the new borough in November, 1900, and he had been during many years an active member of the old vestry. Of Mr. Collins's principal architectural works we have illustrated the following:—The Captain Lazarus S. Magnus Memorial Synagogue, with Rabbi's residence, after the Byzantine manner, in High-street, Chatham (September 10, 1870; interior); a large warehouse, for Mr. Fairbank, at the corner of St. Mary Axe and Camomile-street, E.C. (September 7, 1878); the Westminster Jews' Free School, Hanway-place, W. (October 6, 1883; with two plans); and St. James's Industrial Dwellings, thirty-three tenements, in Silver-place and Ingestre-place, Golden-square (March 27, 1886; view, plans, sections, etc.), for which his designs were selected in a limited competition; and the premises in Haymarket at the corner of Coventry-street, after the French Renaissance manner (September 3, 1887). He was the architect of the West London Synagogue, Upper Berkeley-street, W.; and of the North London (Lofting-road, Barnsbury), 1868, Borough New (Heygate-street, Walworth), 1867, and Abbey-road (St. John's Wood) 1880, Synagogues—the last-named being in a free treatment of the Byzantine style; Nos. 8-9, Arundel-street, Coventry-street, W.; three blocks of working-class dwellings in Brady-street, Whitechapel, for Messrs. N. & R. Davis, with the laying-out of a new street between Brady-street and the dwellings; new premises in Fetter-lane (east side), at the corner of West Harding-street, for Messrs. E. Barnard & Sons, silversmiths (1898), and in that year he was invited, with seventeen others, to submit designs for artisans' dwellings upon part of the Millbank, Westminster, estate, for the London County Council. For Messrs. N. & R. Davis he also formulated an extensive scheme for the making of a new thoroughfare, Teesdale-street, leading out of the north side of Bethnal Green-road, and the widening of Blythe-street and Old Bethnal Green-road, together with the erection of 141 houses fronting on Blythe-street and the new street for 1,692 persons, and similar schemes for widening parts of Langdale, William, James, and Samuel streets, Stepney, with the erection of about thirty new houses therein (1900-3). Mr. Collins prepared the plans and designs for a block of twelve residential flats upon a site between Brompton-square and Cheval-place, Brompton-road, S.W.; premises in Backchurch-lane, Whitechapel, for Messrs. Kinloch & Co., at a cost of some 25,000*l.* (1894); the block of offices and shops in Fenchurch-street between No. 119 and Cullum-court; premises for Messrs. R. Waygood & Co., lift manufacturers, at Falmouth-road, Great Dover-street, S.E. (1904); business premises at the corner of St. Paul's-churchyard and Dean's-court; new buildings on the site of Boord & Son's distillery, Bartholomew-close, E.C.; and a building for the Committee of the Home for Incurable Children, North-court, Finchley-road, N.W. With Mr. Marcus E. Collins he was architect of Audrey House, erected after the Renaissance style freely treated, upon a site of 14,000 ft. superficial, on the west side of Ely-place, Holborn, two years ago; No. 14, Avenue-road, St. John's Wood, N.W., at a contract for 16,575*l.*; and No. 39, Bishopsgate-street Within, for the Transvaal Gold Fields Company (1896-7); and the recent rebuilding of No. 23, and of Nos. 26-7, St. James's-street, S.W. In April, 1904, Messrs. H. H. & M. E. Collins won the first premium in a competition limited to six architects for the rebuilding, at an estimated cost of 20,000*l.*, of the City of London Lying-in Hospital, upon the old site in City-road, E.C. In conjunction with the late Professor Banister Fletcher Mr. Collins was architect (1886) of the block of buildings in Oxford-street, at the corner, east, of Wardour-street, for the Oxford-street Land Investment Company. In 1863-4 he was joint architect with E. Bassett Keeling for the erection, on the site of the New Exeter Change, of the Strand Music Hall, designed by Keeling, and remarkable for what the architect claimed to be the "Continental Gothic" of its brick façade, and for the method of artificial lighting from a chamber beneath the roof. The music-hall gave place to the (old) Gaiety Theatre.

MR. O'CALLAGHAN.—The death is also announced of Mr. J. J. O'Callaghan, R.I.A.I. and A.A.I., of Dublin, aged sixty-seven years. In 1894-8 Mr. O'Callaghan made designs for the improvement of St. Macculiin's R.C. Church, Lusk, and for the high altar and two side-altars; in 1898 he carried out some extensive alterations and improvements of the Burlington Hotel and Restaurant in St. Andrew-street, Dublin. He was architect of the College at Mullingar, Co. Westmeath, for the Bishop of Meath, and of many Roman Catholic churches and chapels, seminaries, convents, and similar institutions in Ireland. Mr. O'Callaghan was elected a member of Council, Royal Institute of the Architects of Ireland in December, 1900, and member of the Committee, Architectural Association of Ireland for the session 1903-4.

GENERAL BUILDING NEWS.

CHURCH OF ST. JAMES', BARTON HARTSHORNE, BUCKS.—This church has just been reopened after renovation. The total cost of the work, which consisted of the entire renovation of the whole fabric, was 600*l.* The church originally consisted of a nave and a chancel, probably built, as indicated by the details of the old south doorway of the nave, about A.D. 1230. In A.D. 1843 the old chancel was pulled down, and the church extended eastwards, the present chancel and shallow transepts built, and the whole fabric covered with a very low-pitch slated roof. The restoration commenced in June last, and it includes the removal of the low-pitched roof, with its flat plastered internal ceiling, added to the church in 1843, the whole being much out of repair, and the substitution of a new trussed rafter roof in seven cants, covered externally with red tiles, bringing back the external and internal proportions of the church to their ancient effect. New two-light windows have been inserted in the transept ends, and also a three-light window in the east wall of the chancel, and stone arches have been erected dividing the transepts from the nave. The high pews have been removed throughout the building, and new oak seating placed in their stead. The whole of the floor area within the walls has been covered with cement concrete, upon which has been laid hard stone paving in the chancel and gangways, and wood block flooring under all seating spaces. The new chancel screen, pulpit, reading-desk, and lectern have been executed in oak, and the church has been heated by Mr. John Grundy, of London. New brass chandeliers, made after an old example, have been provided to light the church. The altar hangings and frontal, designed by the architects, have been supplied by Messrs. G. Muntzer & Son, of London. The whole of the structural alterations, chancel, pulpit, seating, and other fittings have been executed from the designs, and under the superintendence of Messrs. P. H. Fielding and W. G. Horseman, architects, of Piccadilly, London, by the contractors for the work, Messrs. G. Tombs & Sons, builders, of Buckingham.

ST. MARGARET'S CHURCH, HUNTLY, N.B.—This church was re-opened on the 5th inst., after having undergone various internal improvements. The work was designed and executed by Messrs. Earley & Co., of Dublin. Mr. Joseph Bligh was the foreman of the decorators. A new pulpit and communion rail, both of oak, have also been placed in the building, the former having been executed by Mr. James Anton, Huntly, and the latter by Messrs. Garvie & Sons, Aberdeen.

ST. JAMES'S CHURCH, CLAPHAM, S.W.—The consecration of the new choir stalls, clergy desks, and organ, has just taken place here. The stalls, wall panelling, and organists' gallery, are all worked in oak in the late Decorated style, freely treated. The work is very massive, the book-boards and seats being 4 in. thick. Messrs. Seth-Smith & Monro were the architects, and Messrs. J. & P. Patrick the contractors.

NEW CHURCH OF ST. WILFRID, LIDGET GREEN, BRADFORD.—The plan of this church is of simple character, all the requirements being included in a parallelogram, containing a nave and chancel and two aisles, and at the four corners, divisions contain respectively: Two porches at the west end, and clergy and choir vestries at the east end. The chancel continues from the nave without altered width or height, but is raised some three steps above the nave level, and the altar (raised some seven steps above the nave) is well in sight from all parts of the church. The whole church is roofed in with one unbroken roof from east end to west end, so that the space above the ceilings of the four corner divisions above mentioned, while adding to the spaciousness of the interior, serve as galleries should such be needed. The church is buttressed all round on the inside, arches being carried from buttress to buttress over the aisle windows, and so giving these last the effect of being deeply set in very thick walls. This treatment carried across the east end of the church gives a passage across the church behind the altar, connecting the north and south sides. The north and south nave arcades are buttressed from the internal aisle buttresses by a transverse arch carried across the aisle opposite each pier. The church seats some 620 people. A slightly sunk chamber at the east end of the church approached from the outside accommodates the furnace for the heating apparatus, and chamber for fuel, and also a water-closet and lavatory, etc. A plain panelled wall lining along each aisle carried up to near the bottom of the windows, and there finished with a wide projecting capping or shelf with a moulded cresting along the front, takes the hot water pipes without their being seen; and these, supplemented by a battery of pipes in the galleries formed by the two vestry ceilings, efficiently and healthily warm the church without draught and without the aid of the dirty and very insanitary sunk trenches which so often cut up and disfigure the floors of a church. The church walls generally are plastered internally and faced externally with the local stone. The roof of the nave is covered with tiles and the roof of the aisles at a somewhat lower pitch are covered with the stone slates from the Fall Top Quarries. The church is paved with local stone flags, and the parts beneath the seats are boarded. The stonework in the windows and external dressings generally is in Weldon stone, and that for the arcades and internal work generally is in bath stone. The cost of the church without fittings was about 8,500*l.* The architect is Mr. Temple Moore, of London. The general contractors are Messrs. John Thompson & Co. (Peterborough); the heating engineers Messrs. John Jeffreys & Co., and the electric lighting contractors Messrs. Belshaw & Co. Mr. J. Crowe, jun., was clerk of works.

WESLEYAN CHURCH, RUMNEY, NEAR CARDIFF.—The enlarged Wesleyan church at Rumney has just been opened. The building has been modernised and a new schoolroom and vestries etc., built. It has been built by Mr. John Charles, of Rumney, from the designs of the architect, Mr. H. P. Sanders, of Cardiff.

PRESBYTERIAN CHURCH, MARYLEBONE.—The new buildings adjoining the church in Upper George-street, Portman-square, were opened on December 13. They comprise a large hall on the ground floor, a hall in the basement for Sunday-school work, a room on the top floor for social meetings, and smaller rooms for the church office-bearers. The plans and designs were made by Mr. W. Flockhart.

ROYAL ARTILLERY THEATRE, WOOLWICH.—A play-house for the troops quartered at Woolwich has been erected from the plans and designs of Mr. W. G. R. Sprague. The theatre will accommodate some 1,100 persons, and can, upon occasion, be utilised as a ballroom.

MOTOR GARAGE, KENSINGTON.—The motor-garage just completed in James-street, Kensington-square, has been erected after designs by Messrs. Crickmay & Sons, of Victoria-street, S.W. It has a frontage of 150 ft. to the street, and a depth of 45 ft., with accommodation for 200 cars. The basement forms an engineer's shop for repairs, a hydraulic lift communicates with each floor, and dressing-rooms and a bathroom are provided for the customers' use. The building is warmed with hot water throughout.

REBUILDING IN REGENT-STREET.—Messrs. R. Creese Harrison & Son have been appointed architects by the London Joint Stock Bank for the rebuilding of their branch bank, Nos. 133-5, Regent-street. The two houses, at the corner, north, of Heddon-street South, form part of a block on the west side of Regent-street, which was erected, it seems, after the designs of Sir John Soane.

REBUILDING IN CHEAPSIDE.—The new buildings for the Scottish Temperance Life Assurance Company are by Mr. Rowntree. They are Nos. 2, 3, and 4, and occupy a part of the new site as re-arranged after the recent widening of the street between the east end of Newgate-street and the corner of St. Paul's-churchyard.

UNITED SERVICE CLUB, PALL MALL.—During the recess extensive alterations and improvements have been carried out under the directions and superintendence of Messrs. Isaacs & Florence. The additions comprise an enlargement of the ground floor smoking-room, and new lavatories with bath and dressing rooms on the basement floor, which has been remodelled and provided with a staircase from the entrance-hall and a lift rising to the first floor. Improvements have been effected in the coffee-room and the kitchen, and in the arrangements for ventilation and sanitation throughout the building. The Office of Woods and Forests recently granted an extension of the lease of the club-house, which was built by Nash in 1826-8, and was enlarged on the east side by Decimus Burton.

SMALLPOX HOSPITAL, BRADLEY.—On the 4th inst. the new South Staffordshire Joint Smallpox Hospital, which has been erected at Bradley, was opened. Mr. George Green, the Wolverhampton Borough Surveyor, prepared the plans, and the cost is estimated to work out at about 18,000*l.*

WORKSHOPS FOR THE BLIND, NEWCASTLE.—Workshops for the adult blind have just been opened at Newcastle. The new buildings are erected on a site of about 660 sq. yds., fronting Breamish-street, and to a side street leading from City-road. On the ground floor a wood-chopping

shed and workrooms for bedding and mattress-making, etc., are provided, as well as store-rooms for straw and other materials. The general contractor for the building was Mr. Thomas Weatheritt; heating, Messrs. Emley & Sons; plumbing work, Messrs. Allinson & Sons, Gateshead; electrical lighting, Mr. Ernest Leng. The designs were prepared by Messrs. Liddle & Browne, architects, Newcastle-on-Tyne, and the work has been carried out under their supervision. The premises are heated by hot-water apparatus, with radiators, and ventilated by trunks leading to an extract ventilator in roof. The system of lighting is electric.

FLOUR MILLS, ELLESMERE PORT.—The Imperial Flour Mills at Ellesmere, which have just been opened, were erected from the plans of Mr. John Clarke. There is accommodation for two complete milling plants, capable of producing about fifty sacks of flour per hour, but for the present only one plant has been installed. Messrs. Luther & Co., of Brunswick, provided the machinery.

POST-OFFICE, RIPON.—New post-office buildings have been erected in North-street, Ripon. They are English Renaissance in style, the ground story being executed in Knaresboro' stone from the Queensland Quarry, the second of thin coursed brickwork, and the third, or attic, story is within a mansard roof covered with Buttermere slates. The heating is partly by hot water and radiators, assisted by open fireplaces. The ventilation consists of fresh air inlets and exhausts opening in the staircase hall, with an extractor upon the roof. The architect is Mr. John G. Burrell, Durham, the principal contractors being Messrs. Barker Bros., Hampsthwaite, *vid* Leeds; and the sub-contractor for carpenters' and joiners' work, Mr. J. H. Coldbeck, Ripon. The carving is by Mr. J. W. Milburn, York, and the plumbing and glazing work by Mr. Harrison. The wood block flooring is executed by Messrs. Greary, Walker, & Co., of London.

SANITARY AND ENGINEERING NEWS.

WATER SUPPLY, STRANRAER.—At a meeting of the Stranraer Town Council on the 11th inst. the question of the water supply was considered. Previously the Council had resolved to spend 6,000*l.* at the waterworks on the recommendation of Mr. Gilbert Thomson, C.E., Glasgow, and called in another expert. The names of three firms were submitted, and the committee decided, after a division, on Messrs. Hill & Hogg, Manchester. At the meeting it was moved that this minute be rescinded, and that Messrs. Crouch & Hogg, Glasgow, being the cheapest, should be appointed to inspect the reservoir. On a vote, the recommendation of the committee in favour of Messrs. Hill & Hogg was carried.

DRAINAGE BY-LAWS.—The Public Health Committee of Paddington reported on Monday the receipt of a letter from the Local Government Board forwarding copy of a communication from the Public Health Committee of the London County Council with reference to a suggestion made by the Royal Institute of British Architects that in cases of reconstruction, etc., of existing drains, a block plan of the premises and a written description of the pipes, apparatus, etc., to be used was sufficient, and that the by-laws made by the London County Council under the Metropolis Management Amendment (By-laws) Act, 1899, should be amended accordingly. The Public Health Committee of the London County Council stated that they had caused inquiries to be made, and had ascertained that the majority of the Borough Councils were opposed to the proposal. The Committee further stated that the London County Council had received no complaints as to the excessive stringency of the by-laws beyond that of the Royal Institute of British Architects, and that the views of the Royal Institute were carefully considered when the by-laws were in draft. The Committee added that they were not prepared, having regard to all the circumstances, to recommend the London County Council to alter the by-laws as suggested.

SOIL AND DRAIN PIPES AND THE LONDON COUNTY COUNCIL.—The attention of the London County Council is to be called by the St. Pancras Public Health Committee to the fact that under the drainage by-laws made by the Spring Gardens authority it is required by By-law 8 (4) that a ventilating pipe of a soil pipe or drain shall have an internal diameter of not less than 4 in., whereas by By-law 11 (paragraph 2) the minimum size of a soil pipe may be 3½ in., and by By-law 4 (paragraphs 9 and 10) the minimum size of a drain pipe may be 3 in., so that sanitary inspectors are obliged to compel builders to put 4-in. ventilating pipes to 3½-in. soil pipes and 3-in. drain pipes.

FOREIGN.

FRANCE.—A temporary Salon for the Chamber of Deputies is to be formed in the Cour d'Honneur of the Palais Bourbon, pending the erection of the permanent building, the plans of which are being prepared by M. Nénot in collaboration with M. Buquet, the architect to the Palais Bourbon. The new Salon will occupy nearly the space position as the old one.——A Committee has been formed for the erection, at Colmart, of a monument to the late sculptor Bartholdi.——A new general hospital is to be built at Verdun, in place of the establishments of St. Hippolyte, St. Nicholas, and St. Catherine, which are old-fashioned and defective.——M. Laloux has been commissioned to carry out a monumental Hôtel de Ville at Roubaix, on the site of the existing building.——The new Claude Bernard Hospital has recently been opened in the XIXth arrondissement of Paris; M. M. Renaud and Desbrochers are the architects.——M. Nénot has been elected President of the Société Centrale des Architectes.——The Conseil Supérieur of the Ecole des Beaux-Arts have nominated M. Olivier Merson as professor at Ecole des Beaux-Arts in place of M. Bonnat.——The Fine Art Committee of the Paris Municipality have accepted M. Besnard's four sketches for the decoration of the cupola of the Petit Palais. The designs symbolise respectively Ancient Art, Secular Art, Religious Art, and Modern Art.——M. Leroy, architect, of Versailles, has been elected President, for 1906, of the Society of Architects of the Seine and Oise department.——A transporter-bridge is to be established over the Seine, at Quillebœuf, to take the trains of the new line from Havre to Pont-Audemer.——The Marseilles Docks Company are about to construct a new graving dock which will take ships up to 220 mètres in length.——It is proposed to hold at Lyons an exhibition of materials and processes connected with the Hygiene of Cities.——An exhibition of Provençal art is to be held next year at Marseilles.——The two days of the Cronier sale have produced receipts to the amount of more than 5 million francs. One picture by Fragonard, "Le Billet-doux," brought 420,000 fr.; and "La Mare dans le Forêt," by Rousseau, went for 110,000.——The death is announced, at the age of 70, of M. Ernest Beaurain, architecte-voyer, member of the Société Centrale des Architectes.——The death is announced, at the age of 74, of M. Adolphe Martial Thabard, sculptor. He was a pupil of Duret, and exhibited for the first time at the Salon of 1863, his work being entitled "Jeune Fille pourtant une Vase." Subsequently he devoted himself entirely to decorative sculpture, in which he had great success. Among his works may be named two bas-reliefs for the veterinary school at Lyons—"Une Leçon de Clinique" and "Une Leçon d'Anatomie"; "Le Génie de la Force," for the City of Pesth; "La Poesie," for the Sorbonne; and "Justice," "Prudence," "Strength" and "Temperance," for the Church of St. Eustache. During many years he did not again exhibit at the Salon. He obtained a silver medal at the Exhibition of 1889, and was Chevalier of the Legion of Honour.

THE PORT OF ANTWERP.—Modifications have been necessary in the Government scheme for extending the port of Antwerp, described in our article of September 2 last, owing to the opposition of a section of the Belgium Chamber. The objections entertained refer to the military and not to the commercial portion of the project, and seem to be quite reasonable. For a small country like Belgium, 4,320,000*l.* is a large sum to expend upon the additional fortifications of a single city, and we feel sure the Government have acted wisely in deciding to reduce the amount to 2,520,000*l.*, or less than three-fifths of the first estimate. By the compromise now effected the outer line of forts will stand as proposed in the Bill, but the inner line of fortification is to be replaced by a zone capable of being flooded at will, a devise which is traditional in the Netherlands. The constructional details of the entire scheme will be referred to a mixed commission, including members of the Chamber and engineering experts nominated by the Government, but we believe that the commercial part of the programme will remain as originally settled.

DISCOVERY OF LIMESTONE IN NORTHERN NIGERIA.—Sir Frederick Lugard, High Commissioner of Northern Nigeria, in his annual report to the Colonial Office, just issued as a Parliamentary paper, writes:—"Professor Dunstan's report upon the examination and valuation of the specimens secured by his mineral survey party has not yet been presented. So far it appears that limestone of excellent quality, suitable for mortar, which will replace the costly import of Portland cement for all masonry work, occurs in many districts bordering the Benue. It remains to locate it at some point on the river's bank, where it can be easily shipped to all parts of the Protectorate. I may add that during my tour we verified the existence of limestone outcrops on the Gongola and at Mutwe, near Gubja. There were also indications at Gubja itself, and we discovered deposits near Katagum, and, most important of all, at a point on the Zungero-Zaria road, not far from Zaria, and on the Wateri river, near Kano. I regard this discovery of limestone as of the utmost importance, and second only to a discovery of coal, in its value for the internal development of the Protectorate. The construction of bridges, culverts, and buildings of all kinds will, by its means, be greatly cheapened, and it is possible that its excavation, burning, and transport to the place where it may be required may become a native industry similar to that in Natron, which is now so widely extended."

SOUTH AFRICA.—A new parish hall, in connexion with St. Mary's Church, Johannesburg, was recently inaugurated. The new building marks the completion of the first instalment of the extensive church building programme in Johannesburg and in the diocese. The building was erected by Messrs. Templar Bros., the clerk of the works being Mr. E. T. Price.——A fine new church is in course of erection in Thaba 'Nchu, from the designs of Messrs. Kallenbach & Reynolds, architects, and under the immediate supervision of Mr. W. H. Ford. The contractor is Mr. L. de Waard, of Pretoria.——Estimates for the erection of a new Dutch Reformed Church in Newcastle, Natal, were being sent in when the last mail left. Already forty tenders from builders had been received, some coming from as far off as Cape Town. This, according to a local correspondent, emphasises the fact that the building trade is suffering very much from the general depression.——The Lieut.-Governor of the Orange Free State recently laid at Edenburg the foundation-stone of a new Anglican Church.——It is expected that the St. James's Mansions, situated at the corner of Eloff and Bree streets, Johannesburg, will be completed early in January. The building, which is four stories high and designed in the English Renaissance style, is for the African City Properties Trust, Ltd. The architects of the building, which will cost 50,000*l.*, are Messrs. McIntosh & Moffat, the builder being Mr. Joseph Pitts.

UNITED STATES OF AMERICA.—According to a report recently made to his Government by the German Consul at Seattle, stocks of American cement there were almost exhausted at the beginning of October, and contractors were obliged to purchase the imported article at 2·50 dollars per cask, or 50 cents advance on the price of the home product. Although the increased import trade which resulted gave an impetus to the building of cement works in the States of California and Washington, the demand for cement is considered likely to keep ahead of the supply by reason of the great activity in building projects in Seattle, Tacoma, and other growing places in Puget Sound, especially Everett and Bellingham.

SWITZERLAND.—The new Casino at Berne is to be built from designs by MM. Lundt and Hoffmann.——The "Church" of St. Paul at Berne, designed by MM. Curgel & Moser, was consecrated on December 3.——The new Astronomical Observatory is to be built at Zurich at a cost of about 1,650,000 francs.——The old school at Berne, which was originally a Franciscan monastery and dates from the XVIth century, is to be demolished.

MISCELLANEOUS.

ARTS AND CRAFTS EXHIBITION SOCIETY.—The eighth exhibition of this society will be opened early in January at the Grafton Galleries. It will consist of contemporary work in design and handicraft (limited to the last twenty years, and not having been previously shown in London), such as designs, cartoons, and working drawings; decorative painting; textiles and needlework; glass, stained glass, enamel, pottery, jewellery, metal work, carving and modelling; plaster work, cabinet work; book decoration, caligraphy, illumination, printing and binding; wall papers, leather work, and other kinds of work at the discretion of the committee. A section of the exhibition will be devoted to a group of selected work from the leading schools of design and handicraft. The receiving days will be Thursday and Friday, December 28 and 29.

MONUMENT TO SIR JOHN STAINER AT OXFORD.—A monument to the memory of Sir John Stainer has been placed in position on the east wall of the ante-chapel at Magdalen College, Oxford. It is the gift of Lady Stainer, and consists of a mural tablet of brass framed in alabaster, executed by Messrs. Kett, of Cambridge, after a design by Mr. G. F. Bodley, R.A.

REFUSE DESTRUCTOR FOR SOUTH AMERICA.—Messrs. Manlove, Alliott, & Co., of Nottingham, are now engaged in shipping to Pernambuco the ironwork, firebricks, and other material required for the erection of a refuse destructor to the order of the Government of that State. The installation consists of seven cells or furnaces, one of which is specially arranged to take the carcases of diseased animals. A water tube boiler is being supplied for the utilisation of a certain amount of the heat generated, and forced blast will be supplied alternatively by means of a combined fan and engine on Manloves' principle, and by steam jets. Hoisting apparatus is provided for dealing with the carcases. The contractors are also shipping the ironwork for the roofs, tipping platform, refuse storage platform, etc.; etc., rendering the plant complete with the exception of the ordinary building work, which will be done by local labour.

THE LIGHTNING RESEARCH COMMITTEE.—The Lightning Research Committee, having achieved the objects with which it was formed, that of collecting facts and publishing a report on the best means of providing against injury from lightning, held its final meeting at the Institute of Architects on Friday, the 8th inst., Mr. John Slater in the chair. The statement of income and expenditure during the five years of the Committee's existence was presented by the secretary. The Chairman, having made appreciative reference to the services of the secretary, Mr. Northover, who had conducted the very extensive correspondence of the Committee, prepared the various press notices, interim reports, and abstracts of documents, and rendered material assistance in the compilation of the final report, proposed that the balance of their funds, amounting to 25*l.* 5*s.* 9*d.* be paid over to the secretary, pointing out that this sum added to what he had previously received would bring his remuneration up to an average of a little over 20*l.* a year for the five years his services had been at their disposal. The proposition having been formally put from the chair was unanimously agreed to. The Chairman acknowledged the indebtedness of the Committee to Sir Oliver Lodge for the practical demonstrations he had so kindly given them in connexion with their inquiry, and for the preface to the report, and also to Mr. Gavey for the time, thought, and labour he had so freely given to the Committee, especially in the preparation of the report. A vote of thanks to Sir Oliver Lodge and Mr. Gavey was thereupon passed by acclamation. A vote of thanks was also passed to Mr. Killingworth Hedges (to whom the inception of the Committee was due) for his gratuitous services as hon. secretary. The business concluded, the chairman formally declared the committee dissolved.

MEMORIAL TO G. F. WATTS, R.A.—On December 13, Sir William Richmond, R.A., unveiled a memorial to the late G. F. Watts in the churchyard of St. Botolph's, Aldersgate. The memorial consists of a mural tablet 3 ft. high, containing a statuette of the late painter, executed in terra-cotta, and designed in the school of arts and crafts established by Mr. and Mrs. Watts. It is to Mr. Watts that we owe the erection of the cloister in the churchyard, latterly known as the "Postmen's Park," and its dedication by him as a memorial of deeds of heroic self-sacrifice which have signalised the lives of private individuals in the discharge of their duty or in the aid of others. The cloister was designed by Mr. Ernest George six years ago in the form of a covered way with a sloping roof supported upon light pillars, and Mr. Watts further undertook to decorate the sheltered wall with painted tablets to record and illustrate the acts of bravery thus commemorated. The memorial bears an inscription: "In memoriam, George Frederic Watts, who, desiring to honour heroic self-sacrifice, placed these records here." At the top are his own words: "The utmost for the highest."

METROPOLITAN WATER BOARD. — The Board have decided to accept a tender of 136,561*l.* 12*s.* 8*d.* from Messrs. J. Moran & Son, of Westminster, for the completion of the construction of a covered reservoir at Honor Oak. The highest of the thirty-nine tenders amounted to 269,480*l.*

PRESENTATION AT NEWCASTLE.—A complimentary dinner and presentation to Mr. Stephen Easten, chairman of the Tyne and Blyth Districts Building Trade Employers' Association, was held at the Hotel Metropole, Newcastle, on the 14th inst. Mr. Alexander Pringle occupied the chair, and Mr. R. Heslop made the presentation.

FORMAN MEMORIAL, REPTON SCHOOL.—The Bishop of Southwell recently visited Repton School for the purpose of unveiling the memorial in the chapel to the late Rev. A. F. E. Forman. The school chapel has been practically doubled in size during the last two years by the addition of an ante-chapel, a north aisle and a north transept for ladies, surrounded by an oak screen. The memorial to Mr. Forman falls in with the scheme, having been designed by Mr. T. B. Carter, the architect for the extensions, and consists of an oak pulpit and vestry screen, with hand carving.

PUBLIC LIBRARIES IN ST. PANCRAS.—The Libraries Committee of St. Pancras Borough Council reported on Monday that they were continuing their inquiries in regard to sites for branch libraries in the vicinity of Euston-road, Camden Town, and Gospel Oak. They were also conferring with the Borough Engineer and the Borough Librarian as to the design for the branch library to be erected in Chester-road. The plans would be ready shortly. A deputation had been received from ratepayers asking for the erection of a branch library in the neighbourhood of Regent's Park-road and Gloucester-gate. The Committee had the matter under consideration.

THE T-SQUARE CLUB.—This Club appears to have been dissolved and re-constituted. At the first general meeting of the new Club, on the 14th inst., the chair was taken by Mr. C. W. Stephenson, and it was proposed by Mr. T. W. Aldwinckle, and seconded by Mr. W. H. Webber, "That the T-Square Club as at present constituted be wound up." This being carried unanimously, it was then proposed by Mr. A. G. Pomeroy, and seconded by Mr. F. D. Clapham, "That the funds at present in the hands of Mr. F. C. Simpson, the Hon. Treasurer of the late T-Square Club, be paid over to Mr. W. H. Webber to defray the expenses incurred by the Suspense Committee, and that the balance be carried to the credit of the new T-Square Club." This being carried, it was proposed by Mr. T. W. Aldwinckle, and seconded by Mr. W. J. H. Leverton, "That a new club be formed to be called the 'T-Square Club,' and that all members of the same shall be members of the architectural or other recognised professions, and shall be solely engaged in professional practice." This was carried, and also a resolution fixing the subscription at that of the old Club—one guinea. The Suspense Committee, consisting of Mr. T. W. Aldwinckle, Mr. Arthur G. Pomeroy, Mr. W. J. H. Leverton, and Mr. W. H. Webber, were unanimously elected as the Executive Committee, with power to form a full committee and any sub-committee. Mr. W. H. Webber (7, Great James-street, Bedford-row, W.C.) was elected Hon. Secretary, and Mr. T. W. Aldwinckle Hon. Treasurer. The first social meeting of the Club will be held on January 22.

INCORPORATED INSTITUTE OF BRITISH DECORATORS.—The Council of this Institute has decided to offer the following medals for the encouragement of colour decoration, viz.:—A gold medal to be awarded yearly or at intervals of not more than three years for either one of the following forms of distinction:—1. Executed decorative work of notable excellence. 2. Published work of conspicuous value to decorators. 3. Scientific invention or improvement in the manufacture of pigments or other materials used in decoration. These medals to be open to Great Britain, Ireland, Canada, and British Colonies. The award will be made by a special vote of the General Council. A small committee will be appointed to examine into and report on the cases which appear to them worthy of this distinction. As each medal will be awarded to one person only, any firm whose work may be considered will be required to declare the name of the individual to whom the merit of the work, as a whole, is chiefly due. Silver medals will be awarded annually to students in the following painting training classes, namely:—(*a*) Training classes of the London technical schools. (*b*) Such technical classes (or students) as may from time to time be nominated by the National Association of Master Painters of England and Wales. (*c*) Such technical classes (or students) as may from time to time be nominated by the National Association of Master Painters in Scotland. (*d*) Such technical classes (or students) as may from time to time be nominated by the National Association of Master Painters in Ireland. One such medal to be awarded in each of the four above-mentioned district divisions for each of the following subjects:—A. To the student who shows the best general knowledge of the principles of architecture in relation to design. B. To the student submitting the best scheme of colour decoration as applicable to the interior of some existing building. Further particulars can be obtained from the Secretary of the Institute of British Decorators, Painters' Hall, Little Trinity-lane, E.C.

SCARBOROUGH MASTER BUILDERS' ASSOCIATION.—The annual dinner of this Association was held at the Albemarle Hotel, on the 15th inst., Mr. R. H. Carr (President) occupying the chair, and being supported by Councillor Mansfield, J.P., of York (ex-President of the Yorkshire Federation of Building Trade Employers), Mr. A. W. Sinclair (who was the previous evening at the annual meeting at Harrogate, elected Vice-President of the Yorkshire Federation of Building Trade Employers), Mr. Oxley Smith (Vice-President of the Scarborough Association), and Mr. Fred Hardgrave (Secretary). Mr. A. W. Sinclair proposed "The Yorkshire Federation of Building Trade Employers." Councillor J. Mansfield (York) responded, and congratulated the proposer of the toast on the honour paid to him in electing him the previous day Vice-President of the Yorkshire Federation. "The Scarborough Master Builders' Association" was submitted by Mr. Oxley Smith, and responded to by the Chairman, and Mr. Chris. Pecket gave "The Architects and Surveyors," for whom Mr. F. A. Tugwell replied.

GOWBARROW FELL.—It is with great satisfaction that we are able to record that the money for the purchase of Gowbarrow Fell, as a gift to the public in perpetuity, has been secured in time to complete the purchase. The thanks of the public are due to the National Trust for having by their energetic action secured this beautiful district from being built over and destroyed. The National Trust have still the option, for five years, of purchasing some further land adjacent to the Glen and Lake, and would be very glad to have further subscriptions towards this end, and towards meeting the legal expenses already incurred. Any communications can be addressed to the Secretary, Mr. Nigel Bond, 25, Victoria-street, S.W.

COST OF PUBLIC WORK.—A deputation representing the Association of Master Plasterers and Painters of Manchester district waited on the 18th inst. on the Lord Mayor of Manchester (Councillor J. H. Thewlis). Mr. W. G. Sutherland said the Association considered they had a real grievance in that most of the public work connected with their trade, such as the painting of public halls, the Town Hall, public libraries and parks, etc., and in connexion with the tramways and other departments of the Corporation was now done by the Corporation and not by tender. In the absence of trained supervision it was not done so economically as it might be, in their opinion. The Lord Mayor pointed out that a works committee of the Corporation had now been formed to look into such matters. He would be obliged if the deputation could find specific instances where work done by the Corporation had been done at a greater cost than it had previously been done by tender.

STAIRCASES FOR THE TUBE RAILWAYS.—The St. Pancras Ironwork Company have received an order from the Underground Electric Railways Company of London for spiral staircases to be fixed at all the stations on the following tube railways:—Baker-street and Waterloo; Great Northern, Piccadilly, and Brompton; Charing Cross, Euston, and Hampstead. There are upwards of forty stations, and each staircase is about 18 ft. diameter, is mounted in a vertical shaft connecting the underground with the surface, and varies from 50 ft. to 200 ft. in height, according to the position of the station. The surfaces of the treads and landings are covered with a new non-slipping material. The staircases are built entirely of steel, and were specially designed by the St. Pancras Ironwork Company for the Underground Electric Railways Company of London. The design is stated to involve an entirely new principle in staircase construction, combining strength with economy of material.

THE ROYAL SANITARY INSTITUTE.—The following members and associates have been elected during the present month:—*Members*—James Booth-Clarkson (Natal); A. G. R. Cameron (Worthing); J. E. Cooke (Tollington Park, N.); H. R. Crabb (Beckenham); E. H. Harrison (Wandsworth Common, S.W.); J. R. Thackeray (Eastbourne); P. B. Tubbs (London). *Associates*—A. D. C. Amos (Shipley); E. R. Arnold (Birmingham); W. Bell (Sunderland); A. Bennett (Hornsey, N.); Miss E. M. Clibbens (Ripley); J. C. Cook (Darwen); J. R. Copping (Darlington); A. Dorin (Hexham-on-Tyne); L. Edwards (Sheffield); R. Edwards (Dolgelly); H. Fox (Audley); Miss Alice E. Hall (Liverpool); E. L. G. Hargrave (Pretoria); G. R. Innes (Durham); J. H. Jackson (Hull); M. W. Kinch (Acton, W.); H. J. Knight (Northampton); Charles A. Lake (Belford); R. Lea (Newcastle-on-Tyne); A. J. Meakins (Lynton); A. Ogston (Newcastle-on-Tyne); J. B. Pointon (Merton); J. W. Pratt (Sandgate); H. Stazicker (Preston); R. W. Strother (Berwick-upon-Tweed); J. R. Tesseyman (Whitby); M. Turnbull (Durham); W. Walker (Ashbourne); C. W. Ward (Hong Kong); B. S. Williams (Swindon).

DRAWING PENCILS.—Mr. F. E. Potter sends us two assorted packets of the "Koh-i-noor" drawing pencils manufactured by the Austrian firm of Hardmuth. They are not cheap (as pencils now go), being 4*d.* each or 3*s.* 6*d.* a dozen, but they seem to be worth their price, being not only firm and clear in their marking, but possessing also the merit of rubbing out well, which for architects is important. They range through seventeen degrees of quality; from "B" to "6 B" and from "H" to "9 H," with "HB" and "F" between. We do not see the use of so many normal shades of soft and hard, some of which it must be difficult to distinguish without the lettering, and which are only troublesome to the possessor; three shades of "hard" and four of "black" are as much as anyone wants in practice. But they are undoubtedly first-rate pencils.

CAPITAL AND LABOUR.

STATE OF THE BUILDING TRADES.—Employment in the building trades continued dull during November, and on the whole was a little worse than a month ago. Plumbers and slaters and tilers in England reported a slight improvement, but with bricklayers, painters, and carpenters and joiners in England employment was rather worse. Compared with a year ago employment was, on the whole, much the same. With masons and painters in England, and with masons and plasterers in Scotland, employment, however, was rather worse. The percentage of trade union carpenters and joiners unemployed at the end of November was 8·3, as compared with 8·0 per cent. a month ago, and 10·1 per cent. in November 1904. The percentage of trade union plumbers unemployed at the end of November was 11·1, as compared with 12·0 a month ago, and 10·5 a year ago.—*Labour Gazette.*

Legal.

FLEET-STREET NUISANCE CASE.

In the Court of Appeal consisting of Lords Justices Vaughan Williams, Stirling, and Cozens-Hardy, on the 14th inst., a considered judgment was delivered in the case of Rushmer *v.* Polsue & Alfieri, Ltd., on the defendants' appeal from a decision of Mr. Justice Warrington.

In this case the plaintiff, a dairyman, carrying on business and residing in Gough-square, Fleet-street, claimed an injunction to restrain the defendants, their servants and workmen from so working their engines and machinery, and so carrying on their printing-works in Wine Office-court as by reason of noise or otherwise to cause a nuisance and annoyance to the plaintiff as lessee or occupier of his premises in Gough-square. The defendants are letterpress art printers and publishers, and last September went into occupation of No. 10, Wine Office-court and set up and began working printing machinery in the basement of the premises, which immediately adjoined those of the plaintiff. The plaintiff's case was that the defendants' machinery caused such a noise both night and day as to be an intolerable nuisance both to himself and family. The defence was a general denial of the plaintiff's allegations, the machinery being, it was said, of the most modern type, and almost noiseless. The main point, however, taken was that the plaintiff's premises were situate in the heart of a district which was almost entirely devoted to the printing and allied trades, and having regard to all the circumstances of the locality, and in particular to the nature of the trades usually carried on there, and the noises and disturbances existing prior to the commencement of the defendants' operations, the action was not maintainable. Mr. Justice Warrington held that the question he had to answer was whether the defendants by working the machinery seriously interfered with the comfort physically of the plaintiff and his family in the occupation of his house according to ordinary notions prevalent among reasonable English men and women. His lordship answered this question in the affirmative, and granted the plaintiff a perpetual injunction restraining the defendants in general terms from working their machinery in such a way as to occasion a nuisance to the plaintiff. From that decision the defendants now appealed.

Mr. Duke, K.C., Mr. Hinde, and Mr. Couch appeared for the appellants, and Mr. H. Terrell, K.C., and Mr. Coote for the respondent.

Their lordships accepted Mr. Justice Warrington's findings of fact and his enunciation of legal principles, and dismissed the appeal with costs.

It is understood that the defendants intend to appeal to the House of Lords.

ACTION AGAINST BUILDERS.

The case of Lilly *v.* Wontner & Co., Ltd., came before Mr. Justice Bray and a common jury in the King's Bench Division on the 18th inst., an action brought by the plaintiff, Mr. W. G. Lilly, against the defendant company to recover 80*l.*, the sum alleged to be due for work and labour done.

Mr. Lewis Thomas appeared for the plaintiff, and Mr. Ellis Hill for the defendants.

Mr. Lewis Thomas, in opening the case, said that the plaintiff had had about thirty years' experience in the building and decorating trades, and in 1904 defendants engaged him to prepare estimates in respect of certain work defendants desired to tender for. The terms of remuneration were that, on the acceptance of the tenders, Mr. Lilly was to supervise the work and receive 20 per cent. of the profits. Plaintiff sent in altogether sixteen tenders to different places and three of these were accepted, among which was a contract for the decoration of the Union Infirmary in Lown-road, Rotherhithe. The contract was accepted at the sum of 1,987*l.* and the profit to the contractors was estimated at the sum of 400*l.*, of which 20 per cent. was 80*l.*, the sum the plaintiff claimed to be entitled to. The plaintiff was astonished to receive a communication from the managing director of the defendant company that they did not propose to go on with the work, and the defendant company did not proceed with the work.

The plaintiff was called and gave evidence in support of his case. In cross-examination, he stated that the managing director of the defendant company did not say that, if the work was proceeded with, it would be a financial loss.

At the close of the plaintiff's case Mr. Thomas Wontner Smith, the managing director of the defendant company, gave evidence to the effect that he told the plaintiff that he had been to the Rotherhithe Infirmary and had come to the conclusion that the price was too low.

In the result the jury returned a verdict for the plaintiff for 55*l.*, and judgment was entered accordingly.

ACTION AGAINST THE HAMMERSMITH BOROUGH COUNCIL.

The hearing of the case of Thompson & Jackson *v.* Hammersmith Corporation concluded before Mr. Justice Buckley in the Chancery Division on the 19th inst., an action by the plaintiffs, tailors and outfitters, carrying on business at No. 98, King-street, Hammersmith, for an injunction to restrain the defendants from taking a portion of their premises by proceeding upon a notice to treat to acquire so much of the property as was required for street widening purposes. What the defendants wished to take was a portion of the frontage of the building abutting on the north side of High-street, varying in depth from 5 ft. 2 in. to 7 ft. 2 in. The case for the plaintiffs was that the defendants could not take the part required, but must take the whole.

Mr. Buckmaster, K.C., and Mr. Waggett appeared for the plaintiffs; and Mr. Astbury, K.C., and Mr. Courthorpe Munroe for the defendants.

Mr. Justice Buckley, after hearing evidence and the addresses of counsel, in giving judgment, said the question he had to decide was whether the defendants were entitled to proceed under a notice to treat dated June 16, 1905, in respect of a house, No. 98, King-street, Hammersmith. It was a notice to treat by which the defendants desired to acquire a strip off the front of the premises varying in depth from 5 ft. 2 in. at the eastern end to 7 ft. 2 in. at the western end. First as to the law. Sect. 80 of Michael Angelo Taylor's Act did, and sect. 82 did not, after referring to houses, buildings, lands, tenements, and hereditaments, use the words "or any part thereof." Defendants' rights were not, in his opinion, enlarged by any intended alterations which the plaintiffs were to make or were under covenant to make. This did not justify the defendants saying the plaintiffs should make further alterations. That being the law, the facts were as follows:—Plaintiffs on May 15, 1905, took a lease of the house, and at that time had seen a tracing and knew that a widening scheme was proposed and was in contemplation as regarded this house. The plaintiffs obtained a leasehold interest in the house as it was then. The question he had to decide was what rights did the Act give the defendants, and had they the right to take the strip in question? In view of the authorities the question for him to decide was, whether the strip was separable from the house so that it could be removed without destroying the house as a house. By taking the strip the defendants would destroy the whole of the fire-places which warmed the house and the house would not be such a house as it was before. The fact that plaintiffs intended to remove the fire-places, in order to enlarge the premises, was immaterial. He did not think that the defendants were entitled to say, "We will take part of your house and now tell you to build a house further back." Unless the premises on either side of the plaintiffs' premises were set back, the plaintiffs would be prejudicially affected. For these reasons he arrived at the conclusion that the strip the defendants proposed to take was such that the part was not separable from the house so that it could be removed without destroying the house as a house. He held, therefore, that the notice to treat could not be maintained, and he granted the plaintiffs the injunction as prayed, the defendants to pay the costs of the action.

FOLKESTONE PAVING DISPUTE.

The case of the Mayor, etc., of Folkestone *v.* Marsh and Others came, on the 20th inst., before a Divisional Court of King's Bench, composed of the Lord Chief Justice and Justices Lawrance and Ridley, on a special case stated by magistrates under the Private Streets Works Act, 1892.

Mr. Macmorran, K.C., Mr. C. Glen, and Mr. Bethune appeared for the appellants, the Mayor, etc., of Folkestone; and Mr. Scholefield for the respondents.

Mr. Macmorran, in opening the case, said that the real question at issue was whether the particular road or part of a road was, under the Act in question, a highway repairable by the inhabitants at large. The case was a peculiar one, and turned upon an agreement arrived at in 1879 between the then owners of the land abutting on the road and the local authority. The road in question was the Shorncliffe-road, Folkestone, and the respondents were the frontagers. They had been called on to contribute to its making up, and they set up that in 1880 it was dedicated to the public and accepted by the local authority, and was now repairable by them. It was also contended that this road had taken the place of an old road stopped up, and, being a substituted road, it was a highway repairable by the public authority. It was admitted that the local authority had always repaired the roadway. The magistrates held that, as the road was dedicated to the public and accepted by the appellants, and was in substitution of an old road, there must be judgment for the respondents.

In the result the Lord Chief Justice, in giving judgment, said he thought the view taken by the magistrates was correct. He thought the road in question was nothing more than a substituted road for the old one closed, and carried with it the old obligations, and was repairable by the inhabitants at large.

Justices Lawrance and Ridley concurred, and the appeal was accordingly dismissed.

PATENTS OF THE WEEK.

APPLICATIONS PUBLISHED.*

26,895 of 1904.—C. J. Jones and W. M. Slill: *Water Heating Apparatus.*

This relates to a water heating apparatus wherein the gas supply is regulated by a thermostatic gas-regulating device formed with water and gas chambers, respectively forming part of the water circulating pipes and the gas supply pipe, and having said chambers separated by an expansible vessel or the like adapted to regulate a valve controlling the passage of gas through said chamber.

27,630 of 1904.—F. J. Carl and H. G. Carl: *Window Sashes.*

This relates to the combination in a window of sliding and swinging upper and lower sashes, the sashes carrying hinge sockets or plates, and stationary hinge pivots being provided upon the frame engaging said sockets or plates in both the upper and lower positions of the sashes.

384 of 1905.—J. Linley: *Means of Securing Door Frames in Position.*

This relates to means of securing door frames in position, and consists of a socket or shoe of cast iron, or other suitable metal made with a dowel to enter a hole in the floor or threshold, and adapted to receive the lower end of the door frame or post, so as to secure it to the floor or threshold, in such a way as to strengthen the door frame in its position.

1,111 of 1905.—W. T. Robertshaw. *Hinges for Draught-Excluders, Doors, and the like.*

This relates to a hinge for draught-excluders, doors, and the like, to which an automatic opening or closing movement is given by means of a coil spring attached to the hinge in such a manner that one end rests upon one half of the hinge and the other end upon the other half of the hinge.

1,998 of 1905.—C. L. G. Bisson and C. S. Bisson: *Chimney Cowl.*

This relates to a chimney cowl, and consists in the combination of flanged pipe fixed in the chimney or in the chimney pot, a pipe rotating round same above the flange, a circular or other suitably shaped piece of metal forming a hood secured to the rotating pipe so as to rotate therewith, wind vanes secured to the said hood or to the rotating pipe to keep the back of the cowl to the wind and means for supporting said rotating pipe and hood.

6,106 of 1905.—W. Nickol: *Chimneys and Ventilating Appliances for Buildings and like Structures.*

This relates to a ventilating appliance for buildings and like structures, comprising a crown or equivalent shaped open structure secured at the top part of the chimney or shaft, in combination with a vertical rod free to oscillate on a ball or movable piece, said rod carrying radial plates or equivalent projections at its upper end, and a swivelling or movable shield or its equivalent at the lower end.

6,917 of 1905.—W. H. Tonks: *Emergency Exit Fastenings or Panic Bolts for Doors and Windows.*

This relates to emergency exit fastenings or panic bolts for doors and windows, and consists in providing the handle of the panic bolt operating mechanism with a double bevil pinion like boss gearing with bevil quadrants attached to or forming parts of links jointed to the sliding bolts whether the operating handle is actuated directly by pressure thereon or by pressure on a crush bar jointed to the handle.

7,105 of 1905.—P. A. Newton (New Jersey Wire Cloth Co.): *Fireproof Constructions.*

This relates to a centring construction for flanged beams of the class having the centring supported by clips from the bottom flanges, and consists in the use of a centring support consisting of a soffit board positioned below the beam to provide space for concrete between the board and bottom of the beam, and supported from the clips by hangers extending through the soffit board.

9,496 of 1905.—O. Bohne and J. G. Herrmann: *A Process of Preparing Wood for Polishing Purposes.*

This relates to a process for preparing wood for polishing purposes, and is characterised by filling the pores of the wood with a dry material in the form of a powder capable of binding well and making the mass filled in insoluble by moistening with an alcoholic solution of shellac.

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

11,544 of 1905.—R. L. YOUNG: *Fire-Places, Ranges, and the like.*

This relates to kitchen ranges and the like, and consists in the combination of a removable solid plate, which rests on and completely covers the bottom of the grate so as to prevent any air getting up through the bottom, with a second inclined perforated plate or grating so arranged as to reduce the fire or coal space and also form a combustion chamber in front of and under the boiler.

26,403 of 1904.—C. G. ROBINSON and J. KERSHAW: *Basement Structures for Buildings and other similar places.*

This relates to basement structures for buildings and other similar places, consisting in forming the sides of the basements by steel or iron stanchions supported on suitable extended bases, cantilevers projecting from said stanchions, a second series of vertical stanchions or columns at a distance from the first series of stanchions, horizontal beams to which the second series of stanchions and cantilevers are connected and a masonry, brickwork, concrete, asphalt, or like filling between the second series of stanchions and the beams.

28,234 of 1904.—J. WHITEHEAD: *Construction of Sectional Wood Paving Blocks for Floors, Roadways, Pavements, and the like.*

This relates to a sectional wooden paving block formed of wooden sections secured together by corrugated metal plates driven into saw cuts in the sides of the sections and extending across the joints of the same, with or without similar corrugated plates driven into the ends of the sections across the joints of the same.

28,683 of 1904.—E. ROBINSON: *Apparatus for Heating, Humidifying, or Cooling Air, for Warming, Drying, or Humidifying Purposes.*

This relates to an apparatus for heating, humidifying, or cooling air, for warming, drying, or humidifying purposes, and consists of a tubular cylinder with spiral diaphragm, in combination with a fan or blower and any suitable system of blast pipes for distributing either heated or cooled air in buildings or other enclosures.

28,684 of 1904.—E. ROBINSON: *Apparatus for Drying and Screening Sand, Minerals, and Other Substances.*

This relates to an apparatus for drying and screening sand, minerals, and other substances, and consists of the revolving drying cylinder fitted internally with a continuous spiral having diaphragm lifters arranged so as to restrict, regulate, and control the movement of the material being dried, such cylinder revolving in a horizontal plane over a furnace and flue together with a jacketed chimney for heating air by the escaping gas and utilising the same by means of an exhaust fan. The drying cylinder terminates in rotary screen, thus the drying, screening, and finishing is accomplished in one operation.

3,094 of 1905.—J. R. PRESTON: *Flushing Devices.*

This relates to a flushing device, and consists in the arrangement of a bell connected to a siphon pipe and containing a float normally held down by a trigger or catch device, which float on being allowed to rise, carries or pushes the water up the bell and over the siphon, thus completing the siphon.

12,242 of 1905.—J. N. GOODALL: *Coupling Devices for Conduits.*

This relates to a coupling device for connecting two separated conduits ends, said coupling device comprising a barrel-member which is shorter than the distance between the ends of the conduit to be coupled, and which has a central portion of enlarged diameter and reduced ends, one of which is internally screw threaded, and the other of which is adapted to be connected to one of the conduit ends, and a pipe section telescoping within the barrel-member and non-detachable therefrom, said pipe section having on its inner end a screw-threaded head to engage the interior screw threads of the barrel-member, and having its other end adapted to be connected to the other conduit.

14,694 of 1905.—S. R. DRESSER: *Coupling for Spigot and Socket Pipes.*

This relates to a coupling for spigot and socket pipes in which the socket ends of the pipe sections are formed with two successive balls or sockets, both of which are parallel with the periphery of the spigot end of the pipes, one of the clamping rings having a sleeve provided with a V-shaped end fitting over the spigot end of the pipe section.

16,166 of 1905.—W. E. HASSAM and C. K. PEVEY: *Pavement and Process of Laying the Same.*

This relates to a process of constructing a road or pavement and consists in laying a layer of uncoated stone, compressing said stone until the voids are small, then grouting with a mixture of cement, sand, and water until all the voids in the stone layer are filled, adding the thicker grout of cement, sand, and water, spreading fine stone upon said grout, and compressing it into the surface of the said grout before it is set.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

December 4.—By HARRY SMITH (at Brighton).
Clayton, Sussex.—"Povey's Farm," 17 acres, f. £1,000

December 7.—By HAMPTON & SONS, with WATERS & RAWLENCE (at Salisbury).
Salisbury, Wilts.—Milford-hill, "Eastmount," f., p. 1,800

By WEBB & NIELSON (at Enfield).
Enfield.—Chase Side, "Brecon House" and 2 r. 25 p., f., y.r. 45*l.* 885

December 8.—By O. E. GRIFFITHS (at Burwell).
Burwell, Cambs.—"Goose Hall Farm," 81 a. 3 r. 3 p., f., y.r. 35*l.* 935

By R. M. ENGLISH & SON (at Selby).
Greenoak, Yorks.—"Greenoak Hall Estate," 218 acres, f. 3,270

December 11.—By BRODIE, TIMBS, & Co.
Highgate.—5, 6, and 7, Lansdown-ter., f., w.r. 124*l.* 16s. 790

By W. MAURICE-JONES.
Mile End.—83 and 85, St. Dunstan's-rd., f., w.r. 36*l.* 8s. 475

By T. B. WESTACOTT.
Camden Town.—15 and 16, Rochester-ter., u.t. 38½ yrs., g.r. nil, y.r. 100*l.* 980
Rochester-ter., l.g. rents 49*l.*, u.t. 38½ yrs., g.r. nil 867
Rochester-rd., l.g. rents 11*l.*, u.t. 38½ yrs., g.r. nil 204
St. Paul's-rd., l.g. rents 90*l.*, u.t. 44½ yrs., g.r. nil 1,652
Cantlowes-rd., l.g. rents 52*l.*, u.t. 44½ yrs., g.r. nil 979
St. Augustine's-rd., l.g. rents 21*l.*, u.t. 44½ yrs., g.r. nil 395

December 12.—By BATCHELOR & SON.
Bromley, Kent.—Ravensbourne-rd., "Y'Garn," f., c.r. 58*l.* 475

By GREEN & LINES.
New Cross.—37 and 39, Casella-rd., u.t. 51½ yrs., g.r. 10*l.*, y.r. 72*l.* 790

By ROGERS, CHAPMAN, & THOMAS.
Mile End.—78, 80, and 117, Grafton-st., u.t. 20½ yrs., g.r. 7*l.* 10s., y.r. 104*l.* 2s. 830

By EDWIN EVANS (at Battersea).
Battersea.—12, Harbut-rd., u.t. 73 yrs., g.r. 6*l.* 15s., y.r. 33*l.* 315
96, Mallinson-rd., f., c.r. 36*l.* 380
Tooting.—165 and 167, Longley-rd., also "Royston Cottage," adjoining, f., y.r. 104*l.* 12s. 1,500
27, Selkirk-rd., u.t. 73 yrs., g.r. 6*l.*, y.r. 28*l.* 12s. 250

By H. & R. L. COBB (at Rochester).
Strood, Kent.—1, 3, 5, and 7, Bryant-rd., f., w.r. 64*l.* 2s. 8d. 770
Gillingham, Kent.—43 to 49 (odd), Higgins-la., and 29 to 41 (odd), Wyles-st., f. 1,075
Cliffe, Kent.—"Swingate Farmhouse," cottage and 6 a. 3 r. 21 p., f. 750
Enclosures of land, 12 a. 3 r. 38 p., f. 820

December 13.—By HAROLD GRIFFIN.
Clapham.—39, Killyon-rd., u.t. 87 yrs., g.r. 8*l.*, c.r. 42*l.* 420

By HEAPS, SON, & REEVE.
Edmonton.—St. Mary's-rd., f.g. rents 61*l.* reversion in 91½ yrs. 1,050
59 to 79 (odd), St. Mary's-rd., u.t. 91½ yrs., g.r. 40*l.*, w.r. 171*l.* 12s. 300

By SALTER, REX, & Co.
Holloway.—32, Grafton-rd., u.t. 47 yrs., g.r. 6*l.* 6s., c.r. 36*l.* 255
Kentish Town.—45, Clarence-rd., u.t. 33 yrs., g.r. 5*l.*, y.r. 46*l.* 360

By J. T. SKELDING.
Kingsland.—40, Downham-rd. (s.), and stabling, u.t. 12½ yrs., g.r. 3*l.*, y.r. 65*l.* 365
St. Mary's-rd., two freehold building plots .. 180

December 14.—By CHESTERTON & SONS.
Kensington.—49, 51, 53, and 55, Campden Hill-rd., u.t. 48½ yrs., g.r. 50*l.*, y.r. 640*l.* 9,460
Paddington.—12, St. Mary's-sq., and 2 and 4, St. Mary's-ter., u.t. 33½ yrs., g.r. 20*l.*, y.r. 175*l.* 1,450
Kensington.—25, Russell-rd., f., y.r. 95*l.* 1,000

By E. H. HENRY.
City.—146, Upper Thames-st., f., c.r. 130*l.* 2,550
Tooting.—5, 7, 9, and 11, Bellew-st., u.t. 85 yrs., g.r. 14*l.*, w.r. 104*l.* 750

By JENKINS, SONS, & Co.
Deptford.—15, Deptford-green, f., w.r. 16*l.* 18s. 135
52, Watergate-st., f., w.r. 16*l.* 4s. 140

By C. C. & T. MOORE.
Mile End.—1 and 2, Salmen-st., u.t. 41 yrs., g.r. 7*l.* 6s., w.r. 62*l.* 8s. 250
Bethnal Green.—29 to 37 (odd), Punderson's-gdns., f., w.r. 137*l.* 16s. 1,200
13 to 23 (odd), Punderson's-gdns., f., w.r. 124*l.* 16s. 900
Stepney.—10, Dakin-st., f., w.r. 20*l.* 16s. 195
Limehouse.—12, Brenton-st., f., w.r. 27*l.* 6s. .. 235

By NEWSON, EDWARDS, & SHEPHARD.
Islington.—3, Elmore-st., u.t. 47 yrs., g.r. 8*l.*, y.r. 44*l.* 320
Dalston.—12, Downs Park-rd., u.t. 58½ yrs., g.r. 6*l.*, y.r. 36*l.* 360
Holloway.—15, Duncombe-rd., f., c.r. 32*l.* 380
Stoke Newington.—88, Newington Green-rd. (s.), u.t. 44 yrs., g.r. 5*l.*, y.r. 90*l.* 700

By MARLER & MARLER.
Victoria Bazaar Co.—Leases, goodwill, fixtures, and stock-in-trade of business in London and the provinces (as a going concern) 3,500

By STIMSON & SONS.
Hackney.—33, 35, and 37, North-st., f., w.r. 75*l.* 8s. 750
15, Belman-st., u.t. 47 yrs., g.r. 10*l.* 10s., w.r. 36*l.* 8s. 160
6, Dagmar-ter., u.t. 39 yrs., g.r. 4*l.*, w.r. 36*l.* 8s. 175
Deptford.—9, Deptford-bridge (s.), u.t. 55 yrs., g.r. 40*l.*, y.r. 140*l.* 1,430
Mitcham, Surrey.—7 to 12, Cecil-ter., u.t. 86 yrs., g.r. 15*l.*, w.r. 81*l.* 18s. 200

By H. J. BLISS & SONS.
Pimlico.—201, Vauxhall Bridge-rd. (s.), u.t. 18½ yrs., g.r. 8*l.*, y.r. 50*l.* £300
Bethnal Green.—18 and 19, Hersee-pl., f., w.r. 71*l.* 10s. 480
21 and 23, Sale-st., u.t. 20 yrs., g.r. 8*l.* 6s. 8d., w.r. 45*l.* 10s. 115
6, Roman-rd. (s.), u.t. 26½ yrs., g.r. 3*l.* 8s., w.r. 44*l.* 4s. 135
Bow.—1 to 9, 13, 15, 25 to 31 (odd), Ordell-rd., w.r. 313*l.*; also l.g.r. 7*l.*, u.t. 42½ yrs., g.r. 38*l.* 10s. 1,750
Victoria Park.—14, 21, 23, and 25, Olga-st., u.t. 54½ yrs., g.r. 19*l.* 4s., w.r. 163*l.* 16s. 710
126, Grove-rd., u.t. 38½ yrs., g.r. 6*l.*, y.r. 42*l.* 315
Hackney.—3, 25, 27, 29, and 32, Lesbia-rd., u.t. 78 yrs., g.r. 32*l.* 10s., w.r. 170*l.* 1,520
Homerton.—1 to 5, Rosina-cottages, f., w.r. 100*l.* 2s. 785

By FOSTER & CRANFIELD (at Croydon).
Croydon.—119 to 129 (odd), Oval-rd., f., w.r. 153*l.* 1,400
87 to 93 (odd), Oval-rd., u.t. 44 yrs., g.r. 20*l.* 2s., w.r. 98*l.* 16s. 615
12 and 14, Wellesley-gr., f., y.r. 125*l.* 1,730
Lower Addiscombe-rd., "Clairville," f., y.r. 60*l.* 850
Croydon.—17 to 27 (odd), Cross-rd.; also mill premises in rear, u.t. 51 yrs., g.r. 54*l.* 10s., w.r. 209*l.* 16s. 1,000
85, George-st. (s.), u.t. 61½ yrs., g.r. 16*l.*, y.r. 90*l.* 1,280
90, Wellesley-rd., u.t. 54½ yrs., g.r. 14*l.* 5s., y.r. 100*l.* 800
Ashburton-rd., "Embleton," u.t. 58½ yrs., g.r. 8*l.* 8s., y.r. 58*l.* 570

By CECIL HOBDAY (on the premises).
Putney.—Upper Richmond-rd., "The Hollies," and 1 acre, u.t. 58 yrs., g.r. 20*l.* 16s., p. 2,000

December 15.—By J. BOTT & SONS.
Brixton.—32 and 34, Arlingford-rd., u.t. 69 yrs., g.r. 13*l.*, y.r. 70*l.* 4s. 440
Stockwell.—87, 93, and 95, Hargwynne-st., u.t. 68½ yrs., g.r. 16*l.* 10s., w.r. 122*l.* 4s. 920

By BUNCH & DUKE.
Bow.—79, Grove-rd. (s.), u.t. 62½ yrs., g.r. 6*l.* 10s., y.r. 46*l.* 500
9, Lyall-rd., u.t. 40 yrs., g.r. 6*l.* 6s., y.r. 30*l.* 200
10, Athelstone-rd., u.t. 48 yrs., g.r. 5*l.*, y.r. 30*l.* 235

By E. MILLARD.
Brixton.—Sudbourne-rd., "The Branksome Arms," p.h., l.g.r. 55*l.*, u.t. 61½ yrs., g.r. 5*l.* 1,040

By RAY & MURRELLS.
Chelsea.—49, Cadogan-st., u.t. 37½ yrs., g.r. 8*l.*, y.r. 80*l.* 950

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove; b.h. for beerhouse; p.h. for public-house; o. for offices; s. for shops; ct. for court.

MEETING.

SATURDAY, DECEMBER 23.

Edinburgh Architectural Association.—Associates Annual Dinner.

TERMS OF SUBSCRIPTION.

"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 19s. per annum (52 numbers) PREPAID. To all parts of Europe, America, Australia, New Zealand, India, China, Ceylon, etc., 26s. per annum.

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PRICES CURRENT OF MATERIALS.

. Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£	s.	d.			
Hard Stocks	1	7	0	per 1000 alongside, in river.		
Rough Stocks and Grizzles	1	4	0	,,	,,	,,
Facing Stocks	2	0	0	,,	,,	,,
Shippers	2	0	0	,,	,,	,,
Flettons	1	3	6	,,	at railway depôt.	
Red Wire Cuts	1	11	0	,,	,,	,,
Best Fareham Red	3	12	0	,,	,,	,,
Best Red Pressed Bushon Facing..	5	0	0	,,	,,	,,
Best Blue Pressed Staffordshire	4	1	0	,,	,,	,,
Do. Bullnose	4	6	6	,,	,,	,,
Best Stourbridge Fire Bricks	3	15	6	,,	,,	,,
GLAZED BRICKS.						
Best White and Ivory Glazed Stretchers	12	0	0	,,	,,	,,
Headers	11	0	0	,,	,,	,,
Quoins, Bullnose, and Flats	16	0	0	,,	,,	,,
Double Stretchers	19	0	0	,,	,,	,,
Double Headers	16	0	0	,,	,,	,,
One Side and two Ends	19	0	0	,,	,,	,,

BRICKS, &c. (*continued*).

GLAZED BRICKS—*Continued.*

	£	s.	d.			
Two Sides and one End	20	0	0	per 1000, at railway depôt.		
Splays, Chamferred, Squints	20	0	0	,,	,,	,,
Best Dipped Salt Glazed Stretchers, and Header	12	0	0	,,	,,	,,
Quoins, Bullnose, and Flats	14	0	0	,,	,,	,,
Double Stretchers	15	0	0	,,	,,	,,
Double Headers	14	0	0	,,	,,	,,
One Side and two Ends	15	0	0	,,	,,	,,
Two Sides and one End	15	0	0	,,	,,	,,
Splays, Chamferred, Squints	14	0	0	,,	,,	,,
Second Quality White and Dipped Salt Glazed	2	0	0	,,	less than best.	

	s.	d.	
Thames and Pit Sand	6	9	per yard, delivered.
Thames Ballast	5	3	,, ,,
Best Portland Cement	26	0	per ton, ,,
Best Ground Blue Lias Lime	19	0	,, ,,

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 11s. 0d. per yard, delivered.
Stourbridge Fireclay in sacks 27s. 0d. per ton at rly. dpt.

STONE.

	s.	d.	
BATH STONE—delivered on road waggons, Paddington Depôt	1	6½	per ft. cube.
Do. do. delivered on road waggons, Nine Elms Depôt	1	8½	,, ,,
PORTLAND STONE (20 ft. average)—Brown Whitbed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2	1	,, ,,
White Basebed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2	2½	,, ,,

	s.	d.	
Ancaster in blocks	1	10	per ft. cube, deld. rly. depôt.
Beer ,,	1	6	,, ,,
Greenshill ,,	1	10	,, ,,
Darley Dale in blocks	2	4	,, ,,
Red Corsehill ,,	2	2	,, ,,
Closeburn Red Freestone	2	0	,, ,,
Red Mansfield ,,	2	4	,, ,,

YORK STONE—*Robin Hood Quality.*

Scappled random blocks	2	10	,, ,,
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2	3	per ft. super., ,,
6 in. rubbed two sides ditto, ditto	2	6	,, ,,
3 in. sawn two sides slabs (random sizes)	0	11½	,, ,,
2 in. to 2½ in. sawn one side slabs (random sizes)	0	7½	,, ,,
1½ in. to 2 in. ditto, ditto	0	6	,, ,,

HARD YORK—

Scappled random blocks	3	0	per ft. cube, ,,
in. sawn two sides landings to sizes (under 40 ft. super.)	2	8	per ft. super., ,,
6 in. rubbed two sides ditto	3	0	,, ,,
3 in. sawn two sides slabs (random sizes)	1	2	,, ,,
2 in. self-faced random flags	0	5	,, ,,

	s.	d.	
Hopton Wood (Hard Bed) in blocks	2	0	per ft. cube, deld. rly. depôt.
,, ,, ,, 6 in. sawn both sides landings	2	7	per ft. super. deld. rly. depôt.
,, ,, ,, 3 in. sawn both sides random slabs	1	0	,, ,,
,, ,, ,, 2 in. do.	0	8½	,, ,,

SLATES.

In. In.	£	s.	d.	
20×10 best blue Bangor	13	2	6	per 1000 of 1200 at r. d.
20×12 ,, ,,	13	17	6	,, ,,
20×10 first quality ,,	13	0	0	,, ,,
20×12 ,, ,,	13	15	0	,, ,,
16×8 ,, ,,	7	5	0	,, ,,
20×10 best blue Portmadoc	12	12	6	,, ,,
16×8 ,, ,,	6	12	6	,, ,,
20×10 best Eureka unfading green	15	17	6	,, ,,
20×12 ,, ,,	18	7	6	,, ,,
18×10 ,, ,,	13	5	0	,, ,,
16×8 ,, ,,	10	5	0	,, ,,
20×10 permanent green	11	12	6	,, ,,
18×10 ,, ,,	9	12	6	,, ,,
16×8 ,, ,,	6	12	6	,, ,,

TILES.

	s.	d.	
Best plain red roofing tiles	42	0	per 1000 at rly. depôt.
Hip and Valley tiles	3	7	per doz. ,,
Best Broseley tiles	50	0	per 1000 ,,
Do. Ornamental tiles	52	6	,, ,,
Hip and Valley tiles	4	0	per doz. ,,
Best Ruabon red, brown, or brindled do. (Edwards)	57	6	per 1000 ,,
Do. Ornamental do.	60	0	,, ,,
Hip tiles	4	0	per doz. ,,
Valley tiles	3	0	,, ,,
Best Red or Mottled Staffordshire do. (Peakes)	51	9	per 1000 ,,
Do. Ornamental do.	54	6	,, ,,
Hip tiles	4	1	per doz. ,,
Valley tiles	3	8	,, ,,
Best "Rosemary" brand plain tiles	48	0	per 1000 ,,
Best Ornamental tiles	50	0	,, ,,
Hip tiles	4	0	per doz. ,,
Valley tiles	3	8	,, ,,

TILES (*continued*).

	s.	d.	
Best "Hartshill" brand plain tiles, sand-faced	50	0	per 1000 a trly. depôt.
Do. pressed	47	6	,, ,,
Do. Ornamental do.	50	0	,, ,,
Hip tiles	4	0	per doz. ,,
Valley tiles	3	6	,, ,,

WOOD.

BUILDING WOOD.	At per standard. £	s.	d.		£	s.	d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	13	10	0	...	15	0	0
Deals: best 3 by 9	13	0	0	...	14	0	0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11	0	0	...	12	0	0
Battens: best 2½ by 6 and 3 by 6	0	10	0	less than 7 in. and 8 in.			
Deals: seconds	1	0	0	less thn best.			
Battens: seconds	0	10	0	,, ,,			
2 in. by 4 in. and 2 in. by 6 in.	9	0	0	...	10	0	0
2 in. by 4½ in. and 2 in. by 5 in.	8	10	0	...	9	10	0
Foreign Sawn Boards—1 in. and 1¼ in. by 7 in.	0	10	0	more than battens.			
¾ in.	1	0	0	,,			
Fir timber: best middling Danzig or Memel (average specification)	At per load of 50 ft. 4	10	0	...	5	0	0
Seconds	4	0	0	...	4	10	0
Small timber (8 in. to 10 in.)	3	12	6	...	3	15	0
Small timber (6 in. to 8 in.)	3	0	0	...	3	10	0
Swedish balks	2	10	0	...	3	0	0
Pitch-pine timber (30 ft. average)	3	5	0	...	3	15	0

JOINERS' WOOD.	At per standard. £	s.	d.		£	s.	d.
White Sea: first yellow deals, 3 in. by 11 in.	24	0	0	...	25	0	0
3 in. by 9 in.	22	0	0	...	23	0	0
Battens, 2½ in. and 3 in. by 7 in.	16	10	0	...	18	0	0
Second yellow deals, 3 in. by 11 in.	18	10	0	...	20	0	0
,, ,, 3 in. by 9 in.	17	10	0	...	19	0	0
Battens, 2½ in. and 3 in. by 7 in.	13	10	0	...	14	10	0
Third yellow deals, 3 in. by 11 in. and 9 in.	13	10	0	...	15	0	0
Battens, 2½ in. and 3 in. by 7 in.	11	0	0	...	12	0	0
Petersburg: first yellow deals, 3 in. by 11 in.	21	0	0	...	22	10	0
Do. 3 in. by 9 in.	18	0	0	...	19	10	0
Battens	13	10	0	...	15	0	0
Second yellow deals, 3 in. by 11 in.	16	0	0	...	17	0	0
Do. 3 in. by 9 in.	14	10	0	...	16	0	0
Battens	11	0	0	...	12	10	0
Third yellow deals, 3 in. by 11 in.	13	0	0	...	14	0	0
Do. 3 in. by 9 in.	12	10	0	...	14	0	0
Battens	10	0	0	...	11	0	0
White Sea and Petersburg—First white deals, 3 in. by 11 in.	14	10	0	...	15	10	0
,, ,, 3 in. by 9 in.	13	10	0	...	14	10	0
Battens	11	0	0	...	12	0	0
Second white deals, 3 in. by 11 in.	13	10	0	...	14	10	0
,, ,, 3 in. by 9 in.	12	10	0	...	13	10	0
,, ,, battens	10	0	0	...	11	0	0
Pitch-pine: deals	16	10	0	...	20	0	0
Under 2 in. thick extra	0	10	0	...	1	0	0
Yellow Pine—First, regular sizes	44	0	0	upwards.			
Oddments	32	0	0	,,			
Seconds, regular sizes	33	0	0	,,			
Yellow Pine oddments	28	0	0	,,			
Kauri Pine—Planks, per ft. cube	0	3	6	...	0	5	0
Danzig and Stettin Oak Logs—Large, per ft. cube	0	3	0	...	0	3	6
Small ,, ,,	0	2	6	...	0	2	9
Wainscot Oak Logs, per ft. cube	0	5	0	...	0	5	6
Dry Wainscot Oak, per ft. sup. as inch	0	0	8	...	0	0	9
¾ in. do. do	0	0	7	...		—	
Dry Mahogany—Honduras, Tabasco, per ft. super. as inch	0	0	9	...	0	1	0
Selected, Figury, per ft. super. as inch	0	1	6	...	0	2	6
Dry Walnut, American, per ft. super. as inch	0	0	10	...	0	1	0
Teak, per load	17	0	0	...	22	0	0
American Whitewood Planks, per ft. cube	0	4	0	...	0	5	0

Prepared Flooring, etc.—	Per square.						
1 in. by 7 in. yellow, planed and shot	0	13	6	...	0	17	6
1 in. by 7 in. yellow, planed and matched	0	14	0	...	0	18	0
1¼ in. by 7 in. yellow, planed and matched	0	16	0	...	1	0	0
1 in. by 7 in. white, planed and shot	0	12	0	...	0	14	6
1 in. by 7 in. white, planed and matched	0	12	6	...	0	15	0
1¼ in. by 7 in. white, planed and matched	0	15	0	...	0	16	6
¾ in. by 7 in. yellow, matched and beaded or V-jointed brds.	0	11	0	...	0	13	6
1 in. by 7 in. ,, ,,	0	14	0	...	0	18	0
¾ in. by 7 in. white ,, ,,	0	10	0	...	0	11	6
1 in. by 7 in. ,, ,, ,,	0	12	9	...	0	15	0

6 in. at 6d. to 9d. per square less than 7 in.

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £	s.	d.		£	s.	d.
Rolled Steel Joists, ordinary sections	6	5	0	...	7	0	0
Compound Girders, ordinary sections	7	15	0	...	8	15	0
Steel Compound Stanchions	9	7	6	...	10	17	6
Angles, Tees, and Channels, ordinary sections	7	15	0	...	8	15	0
Flitch Plates	8	0	0	...	8	10	0
Cast Iron Columns and Stanchions including ordinary patterns	6	17	6	...	8	0	0

METALS.

IRON—	Per ton, in London. £	s.	d.		£	s.	d.
Common Bars	8	0	0	...	8	10	0
Staffordshire Crown Bars, good merchant quality	8	10	0	...	9	0	0
Staffordshire "Marked Bars"	10	0	0	...		—	
Mild Steel Bars	8	15	0	...	9	0	0
Hoop Iron, basis price	9	5	0	...	9	10	0
,, ,, Galvanised	17	0	0	...		—	

(*And upwards, according to size and gauge.)

Sheet Iron Black—							
Ordinary sizes to 20 g.	9	10	0	...		—	
,, ,, 24 g.	10	10	0	...		—	
,, ,, 26 g.	12	0	0	...		—	

METALS (*continued*).

IRON—*continued.* Sheet Iron, Galvanised, flat, ordinary quality—	Per ton, in London. £	s.	d.		£	s.	d.
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	14	0	0	...		—	
Ordinary sizes to 22 g. and 24 g.	14	10	0	...		—	
,, ,, 26 g.	15	0	0	...		—*	
Sheet Iron, Galvanised, flat, best quality— Ordinary sizes to 20 g.	17	0	0	...		—	
,, ,, 22 g. and 24 g.	17	10	0	...		—	
,, ,, 26 g.	19	0	0	...		—	
Galvanised Corrugated Sheets— Ordinary sizes 6 ft. to 8 ft. by 20 g.	13	10	0	...		—	
,, ,, 22 g. and 24 g.	14	0	0	...		—	
,, ,, 26 g.	15	5	0	...		—	
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	11	10	0	...		—	
Best Soft Steel Sheets, 22 g. & 24 g.	12	10	0	...		—	
,, ,, 26 g.	14	15	0	...		—	
Cut Nails, 3 in. to 6 in.	9	10	0	...	9	15	0

(Under 3 in., usual trade extras.)

LEAD, &c.	Per ton, in London. £	s.	d.		£	s.	d.
LEAD—Sheet, English, 3lb. and up	19	10	0	...		—	
Pipe in coils	20	0	0	...		—	
Soil pipe	22	10	0	...		—	
Compo pipe	22	10	0	...		—	
ZINC—Sheet— Vieille Montagne ton	33	0	0	...		—	
Silesian	32	15	0	...		—	
COPPER— Strong Sheet per lb.	0	1	0	...		—	
Thin ,, ,,	0	1	1	...		—	
Copper nails ,,	0	0	11	...		—	
BRASS— Strong Sheet ,,	0	0	11	...		—	
Thin ,, ,,	0	1	0	...		—	
TIN—English Ingots ,,	0	1	7	...		—	
SOLDER—Plumbers' ,,	0	0	7½	...		—	
Tinmen's ,,	0	0	9½	...		—	
Blowpipe ,,	0	0	10½	...		—	

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2¾d. per ft. delivered.
,, fourths	2d. ,, ,,
21 oz. thirds	3¾d. ,, ,,
,, fourths	3d. ,, ,,
26 oz. thirds	4¾d. ,, ,,
,, fourths	3¾d. ,, ,,
32 oz. thirds	5¾d. ,, ,,
,, fourths	5d. ,, ,,
Fluted Sheet, 15 oz.	3¼d. ,, ,,
,, 21 oz.	4¼d. ,, ,,
¼ Hartley's Rolled Plate	3d. ,, ,,
⅜ ,, ,, ,,	2¾d. ,, ,,
½ ,, ,, ,,	2½d. ,, ,,
Figured and Oxford Rolled Oceanic white	4d. ,, ,,
,, ,, ,, tinted	5¼d. ,, ,,

OILS, &c.	£	s.	d.
Raw Linseed Oil in pipes per gallon	0	1	9
,, ,, ,, in barrels ,,	0	1	10
,, ,, ,, in drums ,,	0	2	0
Boiled ,, ,, in pipes ,,	0	1	11
,, ,, ,, in barrels ,,	0	2	0
,, ,, ,, in drums ,,	0	2	2
Turpentine in barrels ,,	0	3	11
,, in drums ,,	0	4	1
Genuine Ground English White Lead per ton	23	10	0
Red Lead, Dry ,,	21	10	0
Best Linseed Oil Putty per cwt.	0	6	6
Stockholm Tar per barrel	1	12	0

VARNISHES, &c.	Per gallon. £	s.	d.
Fine Pale Oak Varnish	0	8	0
Pale Copal Oak	0	10	6
Superfine Pale Elastic Oak	0	12	6
Fine Extra Hard Church Oak	0	10	0
Superfine Hard-drying Oak, for seats of Churches	0	14	0
Fine Elastic Carriage	0	12	6
Superfine Pale Elastic Carriage	0	16	0
Fine Pale Maple	0	16	0
Finest Pale Durable Copal	0	18	0
Extra Pale French Oil	1	1	0
Eggshell Flatting Varnish	0	18	0
White Copal Enamel	1	4	0
Extra Pale Paper	0	12	0
Best Japan Gold Size	0	10	6
Best Black Japan	0	16	0
Oak and Mahogany Stain	0	9	0
Brunswick Black	0	8	6
Berlin Black	0	16	0
Knotting	0	10	0
French and Brush Polish	0	10	0

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications; and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for models or samples, sent to or left at this office, unless he has specially asked for them.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance. The Editor cannot undertake to read and consider articles offered for acceptance unless they are type-written.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

CONTRACTS AND PUBLIC APPOINTMENTS.

(For some Contracts, etc., still open, but not included in this List, see previous issues.)

CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, etc., supplied by	Tenders to be delivered
Edinburgh.—Materials (Talla Scheme, Contract 47)..	Edinburgh & Dist. Water Trustees	W. A. Tait, C.E., 72A, George-street, Edinburgh	Dec. 27
Salford.—Cast-iron pipes, etc., at Sewage Works	Salford Corporation	Borough Engineer's Office, Town Hall, Salford	do.
Walsall.—Mortuary and Urinal, Portugal-place.....	Walsall Corporation	W. V. Muicaster, Town Clerk. 28, Sandhill, Newcastle-on-Tyne ..	do.
Edmonton.—Guernsey Granite Spalls.....	Edmonton Guardians	F. Shelton, Clerk, Lower Tottenham	do.
Rochdale.—Stores	Rochdale Canal Co.	C. R. Dykes, Secretary, 80, Dale-street, Manchester	Dec. 28
Wilmslow.—New Cemetery (Chapel, House, etc.)	Wilmslow U.D.C.	C. T. Taylor, Architect, 10, Clegg-street, Oldham	do.
Cowdenbeath.—Printers' Work, New Burgh Bldgs. ..	Cowdenbeath Burgh Commissioners	T. H. Ure, Architect, 43, Carnegie-street, Dunfermline	do.
Manchester.—3,500 Tons of Oil	Manchester Education Committee ..	C. Nickson, Town Hall, Manchester	do.
Crumpsall.—Rain-water Pipes, Delaunay's-road	Prestwich Guardians	E. W. Ogden, Clerk, Union Offices, Cheetham Hill-rd., Manchester	do.
Burghead.—Cottage	do.	J. Wittet, Architect, Elgin	do.
Eastville.—Porter's Lodge and Relief Depot, etc.....	Bristol Guardians	J. J. Simpson, Clerk, St. Peter's Hospital, Bristol	Dec. 29
Merthyr Tydfil.—Walls & Playgrd. Troedyrhiw School	Merthyr Tydfil Education Committee	J. Llewellin Smith, Architect, Central-chambers, Merthyr Tydfil..	do.
Merthyr Tydfil.—Latrines, etc., Troedyrhiw Girls' Sch.	do.	do.	do.
Fowey.—Alterations, etc., to Commercial Hotel	Mr. W. Hicks	T. H. Andrew, Architect, Market-hill, St. Austell	do.
Longton.—Sewage Disposal Works	Longton Town Council	J. W. Wardle, Borough Surveyor, Court House, Longton, Staffs ..	Dec. 30
Redmire.—Rebuilding of Wheeling Bridge.....	North Riding County Council	W. G. Bryning, County Surveyor, Northallerton	do.
Carlton.—Rebuilding Brass Sykes Bridge	do.	do.	do.
Caergwrle.—2 Semi-detached Villas.....	.....	J. T. Dennis, c.o. W. E. Jones, Lakefield House, High-st., Caergwrle	do.
Gravesend.—Additions to Engine House, Suffolk-road	Gravesend Town Council	Borough Surveyor's Office, Town Hall, Gravesend	do.
Bingley.—Mixed and Infants' School	West Riding Education Committee	J. Vickers-Edwards, County Architect, County Hall, Wakefield ..	Jan. 1
Wombwell.—Broomhill Prvded. Sch. (Htng. Apprts.)	do.	do.	do.
Denholme Lodge Gate Provided Sch., near Keighley	do.	do	do.
Malden.—Road Materials	Malden and Coombe U.D.C.	District Surveyor, Council Offices, New Malden	do.
Malden.—Stores	do.	do.	do.
*PORTLAND CEMENT	Metropolitan Borough of Poplar....	Borough Surveyor, Council Offices, High-street, Poplar	do.
Leyton.—Nine Miles of Double Tramway Track	Leyton U.D.C.	W. Dawson, Surveyor, Town Hall, Leyton	Jan. 2
Manchester.—Underground Telephone Pipes.....	Manchester Education Committee..	City Surveyor's Office, Town Hall, Manchester	do.
Bury.—Iron Castings	Bury & District Joint Water Board	R. B. Rigby, Waterworks Manager, Parson's-lane, Bury	do.
*NEW SORTING OFFICE AT FOREST HILL.....	H.M. Office of Works	H.M. Office of Works, Storey's Gate, Westminster, S.W.	do.
Dartford.—Making-up Private Streets	Dartford U.D.C.	T. E. Tiffin, Surveyor, Council Offices, Dartford	do.
*ARTIFICIAL FLAG PAVING	Willesden District Council	Council's Engineer, Dyne-road, Kilburn, N.W.	do.
*ROAD-MAKING AND PAVING WORKS	do.	do.	do.
East India.—Deck Bridges	East Indian Railway Co.	C. W. Young, Secretary, Nicholas-lane, London, E.C.	Jan. 3
Bootle.—Painting, etc., Municipal Offices, Trinity-rd.	Bootle Corporation	Borough Engineer's Office, Town Hall, Bootle	do.
Totnes.—Cast iron Socket Pipes	Totnes R.D.C.	F. K. Windeatt, 19, High-street, Totnes	do.
Plymouth.—Block 5 (Housing), How-street	Plymouth Corporation	J. Paton, Borough Engineer, Municipal Offices, Plymouth	do.
Woodford.—70 yds. of Pipes Sewer, Salway-hill	Woodford U.D.C.	W. Farrington, Surveyor, Council Offices, Woodford Green	do.
Elgin.—Dwelling-houses, Culbard-street.....	.....	C. C. Doig, Architect, Elgin	Jan. 4
Burton-upon-Trent.—1,600 yds. of stoneware sewers	Burton-upon-Trent Corporation....	G. T. Lynam, Borough Engineer, Town Hall, Burton-upon-Trent	do.
Manchester.—Fire-clay Goods	Manchester Education Committee ..	C. Nickson, Town Hall, Manchester	Jan. 5
Manchester.—Four Purifiers, etc., at Gaythorn.....	do.	do.	do.
Atcham.—750 yds. of 4-in. Iron Pipe	Atcham R.D.C.	R. A. Wilson, Surveyor, 24, St. John's-hill, Shrewsbury	do.
*NEW SCHOOL, ETC., LITTLE BROMLEY	Essex Education Committee	F. Whitmore, Architect, Duke-street, Chelmsford	do.
Buckley.—Building for Store Shed, Main-street	Buckley U.D.C.	E. Astbury, Council Chambers, Main-street, Buckley	Jan. 6
Ardwick, Manchester.—Mansfield-street School	Manchester Education Committee..	Education Offices, Deansgate, Manchester	do.
Crompton.—Sludge Pressing Machinery	Crompton U.D.C.	T. Mitchell, Sewage Works Superintendent, Shaw	Jan. 8
Crompton.—Gas Engine	do.	do.	do.
Castle Carrock.—Attendants' Cottages	Carlisle Corporation	J. Mansergh & Sons, Engineers, 5, Victoria-st., Westminster, London	do.
Cumwhinton.—Attendants' Cottages	do.	do.	do.
Shepley.—Main and Branch Sewers.....	Shepley U.D.C.	T. Aird Murray, C.E., Independent Buildings, Sheffield	do.
Basingstoke.—Five Miles of Water Mains	Basingstoke Corporation.....	F. R. Phipps, Borough Surveyor, Town Hall, Basingstoke	do.
Bridlington.—Pavilion and Large Café, Princes-parade	Bridlington Corporation	Mangnall & Littlewoods, Architects, 42, Spring-gardens, Manchester	do.
Dover.—Sewers and Surface Drains.....	Dover Town Council.....	H. E. Stilgoe, Borough Engineer, Maison Dieu House, Dover	do.
*ELECTRIC FIRE ALARMS AT INFIRMARY	Croydon Union	H. Berney, Architect, 104, George-street, Croydon	do.
Erdington.—21,000 sq. yds. of Wood Block Paving..	Erdington U.D.C.	H. H. Humphries, Engineer, Public Hall, Erdington, Birmingham	Jan. 10
*STATION MASTERS' HOUSES	Great Central Railway.....	The Engineer, Marylebone Station, N.W.	Jan. 11
*NEW TOWN HALL, LANCASTER	Lancaster Corporation	E. W. Mountford, Architect, 17, Buckingham-street, W.C.	do.
Worksop.—2,000 tons of Slag	Worksop U.D.C.	G. H. Featherston, Town Hall, Worksop	do.
Melton Constable.—Alterations, etc., to School	Norfolk Education Committee	57, London-street, Norwich	Jan. 12
Cley-next-the-Sea.—Alterations, etc., to School	do.	do.	do.
Walsoken.—Enlargement of School.....	do.	T. M. Kerridge, Architect, Club-chambers, Old Market, Wisbech ..	do.
*NEW SCHOOLS, COOKHAM RISE.....	Berkshire Education Committee ..	E. Fisher, 10, York-buildings, Adelphi, W.C.	Jan. 14
Midhurst.—Granite, etc.	Midhurst R.D.C.	A. G. Gibbs, Surveyor, Council Offices, Midhurst	Jan. 15
Durban, Natal.—Steel Pipes.....	Corporation of Durban	W. H. Radford, C.E., Albion-chambers, Nottingham	do.
Ystradgynlais.—Chapel	Trustees of Ynys Calvinistic Church	W. Jones & W. D. Morgan, Architects, Victoria-chambers, Pentre	do.
Ipswich.—Ranelagh-road Council School	Ipswich Education Committee	J. A. Schenermann, Architect, 23, High-street, Ipswich	Jan. 16
Rawmarsh.—Sewage Disposal Works	Rawmarsh U.D.C.	J. Platts, Engineer, High-street, Rotherham	do.
Leeds.—Police Station and Mortuary	Leeds Watch Committee.....	H. Ascough Chapman, Prudential-buildings, Park-row, Leeds	Jan. 17
*WORKHOUSE EXTENSIONS	Uxbridge Guardians.....	W. L. Eves & J. F. Stow, Architects, Uxbridge	do.
*WORKS, MATERIALS, AND SERVICES	Hampstead Borough Council	Borough Engineer, Town Hall, Haverstock Hill, N.W.	do.
*NEW SCHOOL BUILDING AT LLANDUDNO....	Llandudno wi. Conway Co. Sch. Gvs.	G. A. Humphreys, Architect, Llandudno	Jan. 18
Londonderry.—Steam Road-roller, etc.	Londonderry County Council	County Surveyor, County Court House, Londonderry	do.
Maidstone.—Sewage Disposal, Allington & Aylesford	Maidstone Corporation.....	G. R. Strachan, Engineer, 9, Victoria-street, Westminster, S.W. ..	Jan. 20
Oakengates.—Waterworks	Oakengates U.D.C.	R. E. W. Berrington & Son, Engineers, Bank Bldgs., Wolverhampton	Jan. 22
Shelf, near Bradford.—Sewerage, etc., Works	Shelf U.D.C.	J. Drake & Son, Engineers, Queensbury, near Bradford	No date.
Cleckheaton.—Ventilation of Liberal Club.....	.....	T. Ellis, Secretary, Cleckheaton	do.
Lemington-on-Tyne.—Piers and Walls for Bridge....	.....	10, Queen-street, Newcastle-on-Tyne	do.
Lemington-on-Tyne.—Road, etc., over Bridge	.....	do.	do.
Mold.—Erecting five Houses.....	.....	Mines & Sutherland, Ltd., 65, South John-street, Liverpool	do.
Llandudno.—A Pair of Villas	.....	do.	do.
*ADDS., HORNCHURCH PK.-LA. SCHS., ROMFD.	Essex Education Committee	Office of the District Committee, 44, Eastern-road, Romford	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
*HEAD MASTER	Leeds Education Committee	200*l*	Dec. 31
*BUILDING AND DRAINAGE INSPECTOR	Twickenham U.D.C.	2*l.* 15*s.* per week.....	Jan. 1
*SECOND-CLASS ENGINEERS, G.P.O.	Civil Service Commission.....	Not Stated	Jan. 11
*SURVEYOR AND INSPECTOR OF NUISANCES ..	Dawlish U.D.C.....	150*l*.....	Jan. 20

Those marked with an asterisk (*) are advertised in this number. *Competitions*, —. *Contracts*, iv. vi. viii. x. *Public Appointments*, xvii.

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.* [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

APPLEBY.—For erecting an engine-house, boiler-house, coalstore, and dwelling-house, and for sinking a well, for Brumby and Frodingham Urban District Council. Mr. A. Atkinson, C.E., Brigg:—

J. Arundels, Exors.	£3,137	19	6
R. C. Brebner & Co.	1,699	4	0
H. J. Thompson	1,589	7	6
T. Cook Starkey	1,575	4	1
E. Good & Sons, Ltd., Alpha Works, Main-st., Hull*	£1,311	14	2
T. Cuthbert‡	1,270	0	0
A. J. Elmes‡	1,204	0	0
R. H. B. Neal, Ltd.	1,813	0	0

‡ Withdrawn.

BARNTON.—For erecting a new Council school for 300 children. Runcorn-road, for the Sub-Committee for the Northwich district of Chester. Mr. H. Beswick, County Architect, Newgate-street, Chester. Quantities by Mr. George Hutchins, Newry Park, Chester:—

T. Leicester	£5,180	E. W. Bostock	£4,420
T. Smith & Son	4,833	S. Appleton	4,409
Pickstock & Royle	4,688	H. Fairclough	4,310
R. Carlyle	4,678	J. Mayers & Son	4,300
T. & W. Meadows	4,590	T. G. Huxley, Malpas*	4,050
F. Matthews	4,475		

BASINGSTOKE.—For suction gas plant, gas engines, and pumping machinery in connexion with the new waterworks, for the Corporation. Mr. F. Reginald Phipps, Waterworks Engineer, Town Hall, Basingstoke:—

G. R. Mather & Son	£5,765	Campbell Gas Engine Co.	£4,000
J. Andrews & Co.	5,001	Welch, Benham, & Co.	3,994
Kynoch & Co.	4,738	F. Bird & Co.	3,623
Glenfield & Kennedy	4,692	Haste Pump Co.	3,434
Pratchitt Bros.	4,598	J. Watt & Co.	3,216
Fielding & Platt	4,290	G. Walls & Co.	3,151
Dowson Economic Gas & Power Co.	4,258	Tangye, Ltd., Birmingham*	2,970
Pollock, Whyte, & Co.	4,150	J. Holstenholme & Sons‡	2,850
Crossley Bros.	4,117		
Excelsior Eng. Co.	4,053		

‡ Not in accordance with specification.

CHESHAM.—For street works, Eskdale-road, for the Urban District Council. Mr. Percy C. Dormer, Surveyor and Waterworks Engineer, Council Offices, Chesham:—

F. G. Rust	£315	T. Free & Sons	£273
Jesse Mead	295	W. Y. Green & Co.	246
A. J. Mead & Co.	280	F. Fowles, Willesden Green, N.W.*	230

CONGLETON.—Workhouse water supply. Mr. W. Wyatt, engineer, 99, Radford-road, Leamington:—

Water Tower.

J. Stringer, Sandbach* £346 3

Wrought-Iron Tank.

Hall & Lowe, Stoke-on-Trent* 164 5

DOVERCOURT.—For reconstruction and making-up of Nelson-road and Oakland-road, for Harwich Corporation. Mr. H. Ditcham, Borough Surveyor, 7, West-street, Harwich:—

Nelson-road.

G. Double	£693	9	0
F. Bennett	647	0	0
Moran & Son	626	0	0
Wilson, Border, & Co.	£581	0	0
E. E. Newton, Dovercourt*	475	0	0

Oakland-road.

McEntee‡	£973	0	0
Moran & Son	797	0	0
F. Bennett	512	0	0
G. Double	453	14	3
Wilson, Border, & Co.	£450	0	0
E. Saunders, Dovercourt*	344	0	0

‡ Both roads.

DRAYCOTT.—For extension to Victoria Mills, Draycott, near Derby, for Mr. E. Jardine, of Nottingham. Mr. F. S. Antliff, architect and surveyor, Draycott, near Derby. Quantities by the architect:—

E. Hind	£4,870	J. Brown & Son	£4,266
J. & J. Warner	4,520	J. Dickinson	4,198
H. Vickers & Son	4,390	F. Perks & Son, Ltd., Bridge-street, Long Eaton*	3,975
W. Gell & Son	4,365		
F. Messom	4,345		
W. Maule & Co.	4,320		

ERITH.—For technical institute and secondary day-school, Erith, for the Education Committee:—

E. Proctor & Son	£14,240	0	0
Thompson & Beveridge	13,283	0	0
Martin, Wells, & Co.	13,425	0	0
Thomas & Edge	12,754	4	0
J. Willford	12,669	0	0
Kirk & Kirk	12,668	0	0
F. & E. Davey	12,558	0	0
Harris & Wardrop	12,539	0	0
J. Carmichael	12,526	0	0
H. L. Holloway	12,430	0	0
Parren & Son	12,190	9	7
H. Lovatt	12,057	0	0
Gibson & Co.	12,037	0	0
Bowyer & Co.	12,000	0	0
Moss & Co.	11,969	11	8
Myall & Upson	11,929	0	0
Ellingham & Son	11,874	1	4
Gunning & Son	£11,832	15	0
C. G. Hill	11,786	0	0
Kirk & Randall	11,716	0	0
Appleby & Son	11,680	0	0
Enness Bros.	11,635	1	3
Gough & Co.	11,630	0	0
Johnson & Son	11,467	0	0
W. Lawrence & Son	11,427	0	0
Friday & Ling	11,426	16	3
S. E. Nightingale	11,377	0	0
Barker & Co.	11,351	0	0
W. F. Blay	11,261	6	2
W. Moss & Son	11,120	0	0
G. Gates	10,974	0	0
A. Faulke, Sparrow Hill, Loughborough*	10,870	14	9

GRIMSBY.—For supplying and fixing sixty-five sewer ventilating shafts in the North-East Ward. Mr. H. Gilbert Whyatt, A.M.Inst., C.E., Borough Engineer and Surveyor:—

T. W. Greenwood	£328	5	0
J. Duke, Ltd.	266	11	2
D. J. Dolby	228	3	1
Hutton Bros.	214	12	9
E. Tabor	209	18	0
T. B. Redshaw	200	12	6
H. Siddons	198	5	0
J. Waddington & Co.	198	2	1
J. Morfatt	£191	8	11
J. R. Cole	189	2	6
F. Oakes	182	17	0
W. Hardbattle	173	0	0
R. Barnes	171	13	0
Cooper & Berry, Nottingham*	165	16	11

GRIMSBY.—For culverting the Haycroft stream with a 7-ft. diameter circular brick culvert: length, 275 yds. Mr. H. Gilbert Whyatt, A.M.Inst., C.E., Borough Engineer and Surveyor:—

T. D. Ridley & Sons	£3,140	13	8
W. Gilbert	2,980	0	0
T. R. Waterman	2,913	0	0
J. Downham	2,733	6	3
G. Mackay & Son	2,671	14	1
H. J. Mason	2,636	5	1
Hewins & Goodhand	2,489	0	0
J. Sangwin	£2,314	1	1
Hennibique Ferro-Concrete Contracting Co.	2,278	16	0
J. Brunton	2,192	7	3
J. C. Starkey	2,127	15	0
C. Greenwood, Hull*	2,100	10	0

HEACHAM.—For new schools, playsheds, latrines, etc., and master's house at Heacham, Norfolk. Mr. H. J. Green, Architect and Diocesan Surveyor, 31, Castle-meadow, Norwich:—

F. Southgate	£4,664	2	10
Spencer, Santo, & Co.	4,631	17	10
Read & Wildbur	4,368	11	4
T. Anderson	4,359	11	7
J. J. Bone	4,298	0	0
J. Cracknell	4,233	0	0
R. Dye	4,197	15	0
J. Guttridge	4,119	2	6
J. Medwell	4,117	13	0
J. Youngs & Son	£4,113	10	0
T. H. Blyth	3,850	0	0
A. F. Foreman	3,845	3	3
Tash, Langley, & Co.	3,828	9	0
Clark & Sons	3,480	0	0
R. Shanks, Chatteris‡	3,395	0	0

‡ Accepted conditionally.

HENDON.—For making-up Montagu-road, West Hendon, for the Urban District Council. Mr. S. Slater Grimley, Engineer and Surveyor, The Burroughs, Hendon:—

J. Mowlem & Co., Ltd.	£1,183	0	0
J. Shelbourne & Co.	1,156	3	8
T. Adams	1,128	18	5
A. T. Catley	1,090	0	0
R. Ballard, Ltd.	1,048	0	0
F. G. Brummell	£994	19	10
J. & W. Drake, Hammersmith-road, W.*	989	0	0

LONDON.—For additions and alterations to 42, Avenue-road, Regent's Park, W., for Mr. Lionel Asprey. Messrs. Thomas Dinwiddy & Sons, architects, 54, Parliament-street, S.W., and Greenwich:—

G. Munday & Son	£1,350	W. Willett	£1,248
G. R. Shaw	1,328	T. D. Leng	1,158
Killby & Gayford	1,297	Pollard & Brand, S. Tottenham*	1,065
J. B. Cole	1,280		

LONDON.—For erecting a church-parlour and caretaker's residence, Wesleyan Church, Brockley-road, S.E., for the Trustees. Mr. John J. Downes, architect, 199, Lewisham High-road, S.E.:—

G. Parker	£944	15	
F. J. Gorham	905	0	
S. R. Best	833	5	
R. Soper & Son, Deptford*	£698	15	

LONDON.—For repainting of main engine-house, Crossness outfall, for the London County Council:—

W. J. Simms & Sons	£1,693	17	8
W. Dudley	1,070	13	0
Enness Bros.	982	0	0
E. Proctor & Son	896	6	6
G. Forster	868	0	5
J. J. Richards	826	6	2
L. Krzak	725	9	0
Vigor & Co.	618	5	0
Kirkaldy & Son	£575	15	0
A. H. Inns	565	19	11
Wright & Goodridge	565	14	0
W. Hussey	550	5	2
J. Scott Fenn, 42, William-street, Woolwich*	431	12	4

[The chief engineer's estimate for the work was £635 3 4.]

LONDON.—For the partial reconstruction of the bridges carrying Clerkenwell-road over the Metropolitan Railway; Commercial-street, East, over the Great Eastern Railway; East India Dock-road over the North London Railway; and High-street, Kingsland, over the North London Railway (Docks line), for the London County Council:—

W. Moss & Sons, Ltd.	£11,925	6	0
Heenan & Froude, Ltd.	6,035	2	3
J. Strachan	5,950	0	0
A. Thorne	5,830	7	3
Muirhead, Greig, & Matthews	5,493	9	3
A. Fasey & Son	5,416	3	6
G. Hay & Co., London*	5,395	9	9
Johnson & Langley	5,301	16	6

[The engineer's estimate of the cost of the work, £5,929.]

G. Hay & Co. to sub-let to the undermentioned firms (or to such other persons or firms as may be approved by the engineer under the contract) the following portions of the work, namely: (i.) to J. Westwood & Co., Ltd., of London, the manufacture of the steel work; and (ii.) to Improved Wood Pavement Co., Ltd., of London, the wood paving for the bridges.

LONDON.—For steelwork, Greenwich generating-station (second portion), for the London County Council:—

J. Butler & Co.'s Trustees	£57,897	7	7
Head, Wrightson, & Co.	54,918	6	2
Readpath, Brown, & Co.	54,660	4	8
Thames Ironworks, Shipbuilding, and Engineering Co., Ltd.	53,139	5	7
Braithwaite & Kirk	50,275	1	10
J. Westwood & Co., Ltd.	49,461	5	6
Clayton, Son, & Co., Ltd.	47,725	11	2
E. C. & J. Keay, Ltd., Birmingham*	46,460	7	10

[The architect's estimate comparable with the tender is £48,180]

LONDON EDUCATION COMMITTEE TENDERS.

Vincent-square (Westminster Technical Institute).

J. Barker & Co.	£25,680	W. Pattison & Sons, Ltd.	£22,485
S. E. Moss & Co.	24,000	W. Lawrence & Son	22,478
J. Shelbourne & Co.	23,977	Holloway Bros. (London), Ltd.	22,370
Spencer, Santo, & Co., Ltd.	23,700	G. E. Wallis & Sons	22,341
J. C. Richards & Co.	23,589	W. Johnson & Co., Ltd.	22,282
Perry & Co.	23,566	B. E. Nightingale	22,237
J. Mowlem & Co.	23,519	C. Wall, Ltd.	21,979
Prestige & Co.	23,175	F. G. Minter	21,975
Lawrence & Sons.	23,126	Kerridge & Shaw	21,911
F. & T. Thorne	23,000	Waring White Building Co., Ltd.	21,800
Leslie & Co.	22,977	Garrett & Son	21,490
W. Downs	22,968	J. & M. Patrick	21,090
F. & H. F. Higgs	22,948	A. Hudson & Co., 30-32, Queen Anne's-chambers, Westminster*	21,050
Kirk & Randall	22,898		
T. G. Sharpington	22,840		
H. L. Holloway	22,800		
H. Lovatt, Ltd.	22,758		
Martin, Wells, & Co., Ltd.	22,700		
J. E. Johnson & Son	22,673		

[The amount of the architect's estimate comparable with the tenders is £22,275.]

Hammersmith, Latimer-road School (for Improvements).

L. Whitehead & Co., Ltd.	£9,867	0	0
J. Simpson & Son	9,549	0	0
Galbraith Bros.	9,077	0	0
Lathey Bros.	8,307	0	0
E. Triggs	8,107	0	0
S. N. Soole & Son	7,872	0	0
Waring White Building Co., Ltd.	£7,498	0	0
Chinchen & Co.	7,444	0	0
W. Johnson & Co., Ltd., Wandsworth Common*	7,048	19	0

[The estimate of the architect (Education) comparable with these tenders is £6,890.]

Norwood, Gipsy-road (Iron Buildings).

R. Iles, Ltd.	£775	W. Harbrow, Iron Building Works, South Bermondsey Station*	£529
T. J. Hawkins & Co.	630		
Humphreys, Ltd.	560		
J. McManus	545		
F. Smith & Co., Ltd.	543		

Poplar, Brunswick-road Day Industrial School (Iron Staircase).

Merryweather & Sons, Ltd.	£268	15	
Cadogan Iron Works	222	0	
McDowall, Steven, & Co., Ltd.	204	10	
Peirson & Co.	195	0	
G. Mills & Co.	190	0	
Hayward Bros. & Eckstein, Ltd.	179	0	
F. A. Norris & Co.	£173	15	
Hayward Bros. & Eckstein, Ltd.‡	169	0	
A. Ritchie & Co.	162	0	
McDowall, Steven, & Co., Ltd.‡	156	0	
Wilmer & Sons, 11 to 14, Bury-street, St. Mary-axe*	145	0	

‡ Alternative estimate.

Haggerston, Scawfell-street (Porch in Infants' Department).

E. Lawrance & Sons	£325	0	
A. Porter	274	0	
A. E. Symes	248	0	
C. R. Price	239	0	
Marchant & Hirst	234	0	
Stevens Bros.	232	0	
W. H. Lascelles & Co.	£226	0	
J. Grover & Son	225	10	
Barrett & Power	217	10	
F. Bull, 31, Old Hill-street, Upper Clapton*	207	0	

Paddington, N., Campbell-street (Coal Lift).

i. Adapting and re-erecting a coal lift:—

G. Johnson	£18	0	
J. Stannah	16	10	
R. Waygood & Co., Ltd.	13	10	
J. E. Lucas & Son, Brockley*	£13	5	
A. Smith & Stevens‡	10	15	

‡ Tender incomplete.

ii. Trimming floors, providing a casing for coal lift, and forming a door:—

G. Neal	£99	10	
Lathey Bros.	71	0	
C. Johnson	70	0	
H. Eady	59	0	
E. Triggs	£55	0	
Stevens Bros., 1A, Yonge-park, Seven Sisters-road*	51	0	

Kensington, N., Wornington-road (Skylights).

G. H. Sealy	£189	0	
Lathey Bros.	127	0	
T. Lapthorne & Co.	119	0	
C. Johnson	115	0	
Lole & Co.	105	0	
E. B. Tucker	103	10	
G. Neal	94	0	
A. Leather	£88	0	
J. Peattie	78	10	
G. Godson & Sons	73	0	
J. Christie	72	19	
Aldridge & Son, 78, Harlesden-road, Willesden Green*	55	0	

Hackney, S. Homerton-row (Forming Lobby, Reversing Stepping, etc.).

E. Lawrance & Sons	£240	0	
F. W. Harris & Co., Ltd.	213	0	
W. H. Lascelles & Co.	207	0	
G. S. S. Williams & Son	203	0	
W. Shurmur & Sons, Ltd.	198	0	
J. Stewart	£197	16	
Barrett & Power	191	0	
F. Bull	187	0	
J. Grover & Son	179	10	
G. Barker	175	10	
H. Bouneau, 1A and 2, Royal Victor-place, Old Ford*	169	12	

LONDON.—For the erection of factory, Neville-road, Upton Park, E., for Messrs. Weeks & Cooper, Ltd. Mr. W. James Pamphilon, architect and surveyor, 21, Finsbury-pavement, E.C.:—

Larke & Son	£3,718	Hosking	£3,126
Harris & Co.	3,572	Appleby & Son	3,100
Perry Bros.	3,370	Thompson & Beveridge	3,091
Quartermain	3,233	Harris & Wardrop	3,073
Crossley & Son	3,197	Miskin & Son	2,949
Miskin & Son	3,168	Harswill	2,949

LONDON.—For roadwork, etc., reconstruction of lines, in Vauxhall Bridge-road, for the London County Council:—

J. G. White & Co., Ltd.	£21,809	9	6
Dick, Kerr, & Co., Ltd.	21,447	16	5
J. Mowlem & Co., Ltd., London*	20,873	0	0

[The engineer's estimate comparable with these prices is £19,070.]

LONDON.—For cupboards in the bedrooms of Wenlake Buildings, Roby-street, St. Luke, for the London County Council:—

Hibberd Bros., Ltd.	£280	0	0
General Builders, Ltd.	262	5	6
W. H. Lascelles & Co.	£260	0	0
C. Wall, Ltd., 4, Lloyd's-avenue*	235	0	0
H. L. Holloway	97	0	0

LONDON.—For supply of lime for the treatment of sewage, for the London County Council:—

—	Delivered alongside jetty.			Delivered alongside jetty, discharged and unloaded into stores.		
	At Barking, 14,800 tons.	At Crossness, 9,000 tons.	At Barking and Crossness, 23,800 tons.	At Barking, 14,800 tons.	At Crossness, 9,000 tons.	At Barking and Crossness, 23,800 tons
	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.
Formby's Cement Works Co., Ltd.	—	11 8	—	—	—	—
C. Christopherson & Co.	—	—	—	—	—	(5,000 tons) 12 9
W. Fletcher, Lime & Chalk Works, Gravesend*	—	—	—	—	*13 5	—
Associated Portland Cement Manufacturers (1900), Ltd., 72, Fenchurch-street, E.C.*	12 4	12 7	12 4	*13 8	13 11	13 8
New Lime Co., Ltd.	13 3	—	—	14 9	—	—
Buxton Lime Firms Co., Ltd.	14 3	—	—	15 8	—	—
L. Sommerfeld	14 5	14 5	14 5	15 11	15 11	15 11
Valère Mabille	15 9	15 6	15 7½	17 0	16 9	16 10½
L. Sommerfeld	—	16 0	—	—	17 6	—
Current contract prices	—	—	—	15 0	14 5	—

NORTH MUNDHAM.—For alterations and erecting new classroom, etc., at North Mundham Council School, near Chichester. Mr. G. C. Vernon-Inkpen, architect, 40, Commercial-road, Portsmouth:—

J. Croad	£1,125 0	F. J. Privett	£1,045 9
P. J. Durrant	1,123 9	Rowland Bros., 52, East-street, Horsham*	1,019 0
I. Waters & Sons	1,067 0		
W. Potter	1,050 0		

PENDERYN.—For 4,200 yds. of 6-in., 9-in., and 12-in. pipe sewers, etc., at Hirwain, for the Vaynor and Penderyn Rural District Council. Mr. R. C. Jenkins, Engineer and Surveyor, Cefn Coed, near Merthyr Tydfil. Quantities by Engineer:—

J. Sutherland, Abercynon, Glam*.. £2,748 18 7

SETTLE.—For sewerage scheme, for the Rural District Council. Messrs. Barber, Hopkinson, & Co., engineers, Craven Bank-chambers, Keighley:—

Bassington Bros. & Corney, Bridge End, Settle, Yorks £4,505

[Twenty-seven tenders were sent in.]

SOUTHAMPTON.—For private street works at Shirley and Portswood, for the Corporation. Mr. J. A. Crowther, Borough Engineer, Municipal Offices, Southampton. Quantities by Borough Engineer:—

	Portswood.	Shirley.
E. H. King	£3,810 2 3	£3,536 11 2
J. Butt	2,984 7 5	2,700 0 0
J. Douglas	2,599 0 0	2,399 10 0
Dyer & Sons	2,590 0 0	2,520 0 0
F. Osman, Southampton*	2,300 0 0	2,060 0 0

THORNTON HEATH.—For erecting a school for 1,256 children, Winterbourne-road schools, for Croydon Education Committee. Mr. H. Carter Pegg, architect, Thornton Heath:—

Hughes & Stirling	£21,126	Kerridge & Shaw	£18,526
C. Wall, Ltd.	20,294	J. & M. Patrick	18,409
Marriott & Slater	20,050	F. G. Minter	18,334
G. Everitt	19,990	E. J. Saunders	18,289
Dean & Co.	19,912	G. Wales & Co.	18,247
Bowen & Cons.	19,837	W. Smith & Son	17,983
E. P. Bulled & Co.	19,797	Spencer, Santo, & Co.	17,907
Grace & Marsh	19,705	Gann & Co.	17,848
Jones & Andrews	19,641	G. E. Wallis & Sons	17,760
J. Shelbourne & Co.	19,325	B. E. Nightingale	17,753
Wilcock & Co.	19,300	Gathercole Bros.	17,400
H. Kent	19,220	A. Faulks	17,286
Norman & Burt	19,189	W. Lawrence & Son	16,994
W. Johnson & Co.	19,171	R. Cook & Son	16,930
Oak Building Co.	18,985	A. Hudson & Co.	16,877
J. Smith & Sons	18,888	W. Moss & Sons, Loughborough*	16,760
Foster & Dicksee	18,888		
Drowley & Co.	18,880		
J. E. Johnson & Son	18,692		
Martin, Wells, & Co.	18,570		

WAKEFIELD.—For the erection of new imbecile wards and lavatories, for the Board of Guardians, Wakefield Union. Mr. J. Day, architect and surveyor, Central Buildings, Marygate, Wakefield:—

Builder: T. Lee*	£182 5 0
Joiner: W. Stead*	81 0 0
Plasterers: Lockwood Bros.*	46 0 0
Plumbers: Strafford Bros.*	64 17 1
Slater: J. W. Illingworth*	9 17 1

[All of Wakefield.]

WALKEND.—For road works, Church-bank, for the Corporation. Mr. G. Hollings, Borough Surveyor, High-street, Wallsend:—

J. W. Robson, Akenside-terrace, Newcastle ..... Schedule of prices.

WORMINGTON (Gloucestershire).—For providing and laying galvanised piping for water supply to College Farm. Messrs. R. England & Son, architects and surveyors, Oxford:—

A. Estcourt & Sons, Gloucester* £144

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